harman/kardon

Model FL8550

5 Disc Compact Disc Changer

Service Manual



CONTENTS

harman/kardon, Inc.

250 Crossways Park Dr.

Woodbury, New York 11797

Rev1 11/2003

LASER BEAM SAFETY PRECAUTIONS

CLASS 1 LASER PRODUCT

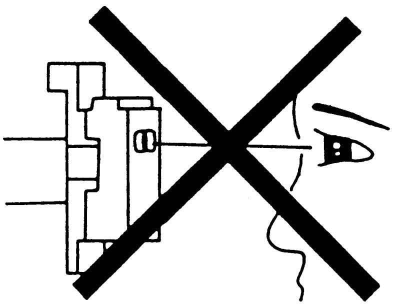


CAUTION

Invisible laser radiation when the unit is open.

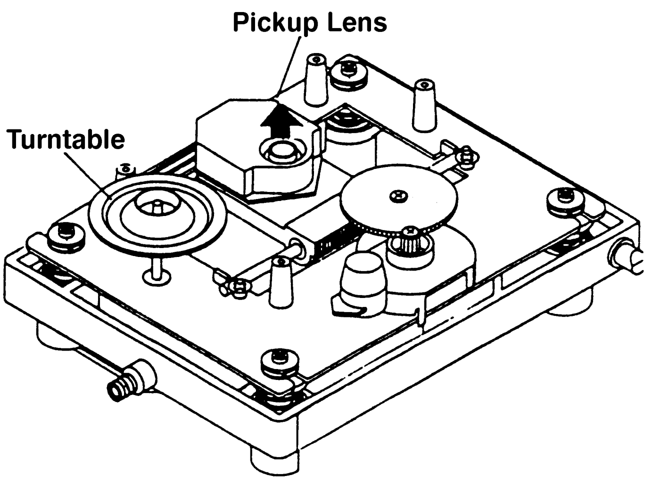
Do not stare into beam.

CAUTION: USE OF ANY CONTROLS, ADJUSTMENT, OR PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.



Do not look directly at the laser beam coming from the pickup or allow it to strike against your skin.

This compact disc player uses a pickup that emits a laser beam. The laser beam is emitted from the location shown in the figure. When checking the laser diode, be sure to keep your eyes at least 1 foot away from the pickup lens when the diode is turned on. Do not look directly at the laser beam.



CAUTION:

Using controls and adjustment, or doing procedures other than those specified herein, may result in hazardous radiation exposure.

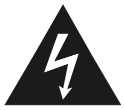
SAFETY PRECAUTIONS



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.



This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Caution: To prevent electric shock do not use this (polarized) plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

Attention: Pour prévenir les chocs électriques ne pas utiliser cetre fiche polarisée avec un prolongateur, une prise de courant ou une autre sortie de courant, sauf si les lames prévent étre insérées à fond-sans en laisser aucune partie à découvert.

HANDLING LASER PICKUP

The laser diode in the optical system of this player can be damaged by electrostatic discharge from your clothes or your body. Proper electrostatic grounding for service personal is required during servicing.

BEFORE REPAIRING THE COMPACT DISC PLAYER

Preparation

Human Body Grounding:

Many of the components used in this compact disc player, including the laser pickup, are sensitive to electrostatic discharge. Service personal should be grounded with an electrostatic armband (1 Mohm).

Caution:

Static charge on clothing does not escape through a body grounding wrist band.

Be careful not to contact the pickup or electrical components with your clothing.

Workbench and Tool Grounding:

A properly-grounded electroconductive plate (1Mohm) or metal sheet should be fitted to the workbench surface. Tools and instruments (such as soldering irons and scopes) should be grounded to prevent AC leakage.

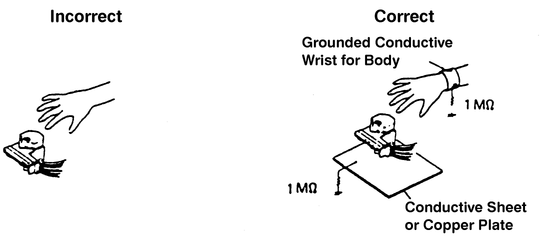


Fig. 1 Fig. 2

Note: Laser diodes are so susceptible to damage from static electricity that, even if a static discharge does not ruin a diode, it can shorten its life or cause it to work improperly.

GENERAL INFORMATION

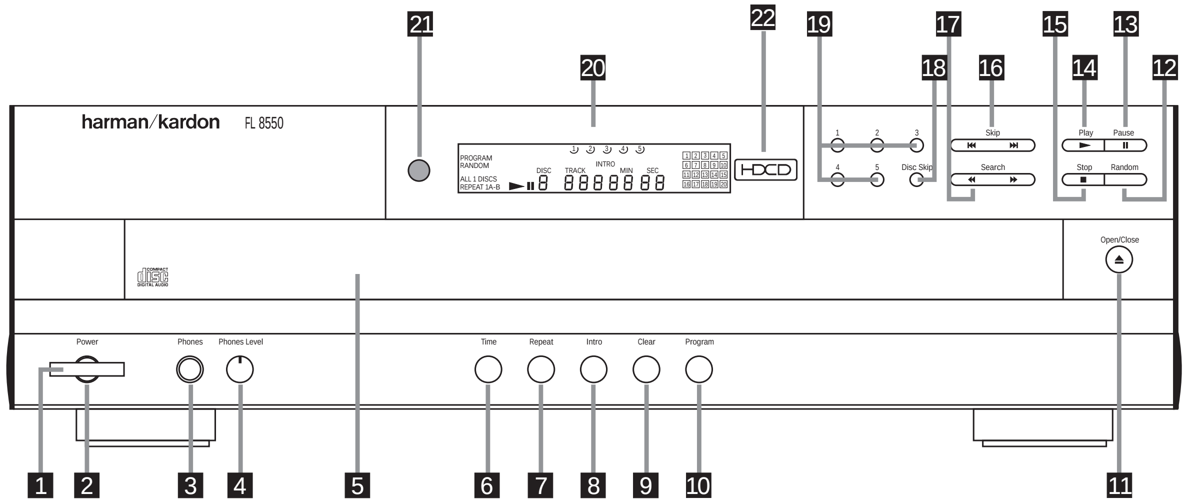
1.	Power Consumption	Operating < 18W; Standby < 5W
2.	Power Supply	230VAC 50Hz or 120VAC 60Hz
3.	Dimensions	440 x 130 x 386 mm
4.	Product Outlook	Refer to attached diagram
5.	Remote Unit	RT03, harman/kardon remote code
6.	Compliance Requirement	CE LVD EN60065
		CE EMC EN55013, EN61000-3-2, EN61000-3-3
		NRTL/C
		FCC
		HDCD
7.	Disc Changer Mechanism	5 disc carousel; Play 1 change 4
8.	Sound Processor	HDCD
9.	CD Servo System	Auto Alignment

AUDIO SPECIFICATION

	Typical	Limit
Output Level 1KHz 0 dB(no HDCD)	2.0 Vrms	± 1 dB
Frequency Response 20Hz~20KHz reference 1KHz	+0-0.5 dB	+0.5-1 dB
THD 1KHz 0 dB 30KHz LPF	0.004%	0.01%
THD 20Hz~20KHz 0 dB 30KHz LPF		0.015%
S/N 1KHz 0 dB A-weighted	105 dB	100 dB
Dynamic Range	100 dB	95 dB
Channel Seperation 1KHz 0 dB	95 dB	90 dB
Channel Balance	± 0.5 dB	± 1 dB
De-emphasis	± 0.5 dB	± 1 dB
Maximum Headphones Level 1KHz 0 dB 32 ohm Load	1.5 Vp-p	± 2 dB

Black Dot TCD725A	1000 µm	600 µm
Interruption MCD-131	900 µm	600 µm
Finger Print TCD725A	75 µm	65 µm
Vertical Deviation MCD-151	1.00 mm	0.92 mm
Eccentricity TCD712	140 µm	140 µm
8 cm disc TCD783	Last Track	Last Track
Access Time 1st to last track YEDS18	4 sec	10 sec

Front Panel Controls



1 **Power Switch**: Press this switch to change the FL8550 from STANDBY to ON. When the unit is first connected to AC power, the **Status Mode Indicator** 2 will turn Amber (STANDBY mode). Press this switch to turn the unit ON; indicator will Green and the **Information Display** 20 will illuminate. Press the switch again to turn the unit off, in STANDBY mode. When the FL8550 is connected to a switched AC outlet, such as those found on the back of many audio products, when power is applied it will return to whatever state it was left in previously, whether ON or STANDBY. In this case, when always left ON, further use of the power switch is not needed.

2 **Status Mode Indicator**: When the FL8550 is in the ON mode, this indicator will glow green. When the unit is off, the indicator will glow amber, indicating that the unit is still connected to the AC mains supply.

3 **Headphones Jack**: Connect a set of standard headphones to this jack for private listening.

4 **Headphones Level**: Turn this knob to increase or decrease the volume level for headphones connected to the FL8550's **Headphones Jack** 3. Note that changing this level will not change the sound level for the unit's main output, as that remains constant.

5 **CD Drawer**: This drawer holds the discs that will be played. Press the **Open/ Close** button 11 1 to open the drawer so that discs may be inserted.

6 **Time Button**: In normal operation, this display will show the running time of the track being played. Press the button once to check the time remaining for the track in play. Press this button again to view the total play time remaining for the disc in play.

7 **Repeat Button**: Press this button once to constantly repeat the track currently being played. Press it a second time to repeat the entire disc.

8 **Intro Button**: Press this button to put the FL8550 in the Intro Scan mode. When you press the button, the unit will play the first 10 seconds of each track on the disc, and then move to the next track. Press the button again to defeat the function and continue full play of the current track.

9 **Clear Button**: Press this button to remove tracks from a programmed sequence. Each press of the button will remove one track, starting with the last track programmed to play.

10 **Program Button**: This button is used to program the playback of a disc in a particular order.

11 **Open/ Close**: Press this button to open or close the disc drawer. DO NOT push the drawer to close it, or damage to the transport mechanism may result.

12 **Random Button**: Press this button to put a disc into play, and to have all of the tracks played in a random order.

13 **Pause Button**: Press this button once to momentarily pause a disc. When the button is pressed again, the disc will resume play at the point it was paused.

14 **Play Button**: Press this button to start the playback of a CD. If the CD drawer is open, pressing this button will automatically close the drawer.

15 **Stop Button**: Press this button to stop the disc currently being played.

16 **Skip Button**: Press either side of this button to move to the next track ►►|, or to move back to the previous track |◄◄ on the disc being played.

17 **Search Button**: Press either side of this button to search forward ►► or backwards ◄◄ through a disc to locate a particular portion of the selection of the disc being played.

18 **Disc Skip Button**: Press this button to change to the next disc. If a disc position is empty, the FL8550 will automatically search for the next position that contains a disc.

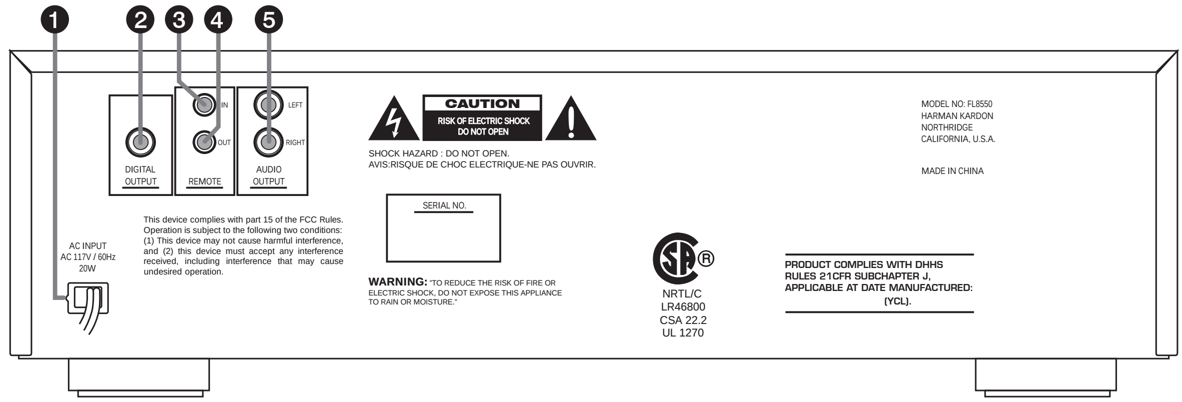
19 **Disc Select Buttons**: Press one of these buttons to select the disc in a specific position in the CD drawer.

20 **Information Display**: This display provides details about the operation of the FL8550.

21 **Remote Sensor**: The sensor behind this window receives commands from the remote control. Keep this area clear if you wish to use the FL8550 with a remote control.

22 **HDCD Indicator**: This LED will light automatically when a CD with HDCD encoding is playing.

Rear Panel Connections



❶ **AC Power Cord**
Connect this plug to an AC outlet. If the outlet is switch is controlled, make certain that the switch is in the ON position.

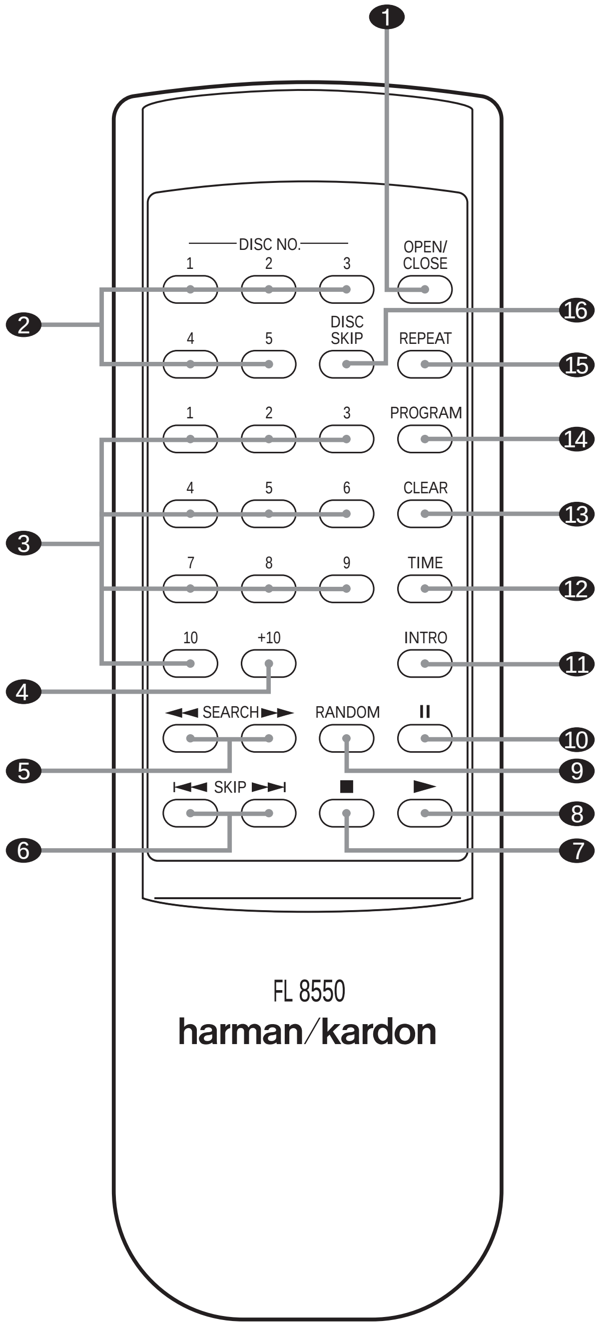
❷ **Coaxial Digital Output**
Connect this jack to the coaxial digital input of an external digital-to-analog converter for direct access to the digital signals of the FL8550. DO NOT connect this jack to the standard audio inputs of any device.

❸ **Remote Control Input**
Connect the output of a remote infrared sensor or the remote control output of another compatible Harman Kardon product. This will enable the remote control system to operate even when the front panel **Remote Sensor** 21 is blocked. It will also allow use of the FL8550 with optional, external control systems.

❹ **Remote Control Output**
Connect this jack to the input of another compatible Harman Kardon remote controlled device to have the remote sensor on the FL8550 provide signals to other products.

❺ **Fixed Audio Outputs**
Connect these jacks to the CD audio inputs of your receiver, surround processor or preamplifier.

Remote Control Functions



1 **Open/ Close Button:** Press this button to open or close the disc drawer. The drawer may also be closed by pressing the **Play** button 14 8. DO NOT push the drawer, as damage to the transport mechanism may result.

2 **Disc Select Buttons:** Press one of these buttons to select the disc in a specific position in the CD drawer.

3 **Numeric Buttons:** Press these buttons to select a specific track on a disc. The FL8550 will immediately search for the track and begin to play it. For tracks 1 through 10 on a disc, you need only press the desired number. For tracks 10 and above, press the **10+** button 4 to select the first digit of the track number, and then press the second digit from these numeric buttons. These buttons are also used to enter track numbers into the memory for pre-programmed play lists.

4 **+10 Button:** Press this button to select the first digit of a track number above 10. Each press of the button increases the first digit one increment. Press it once to start accessing tracks 10 through 19 twice to start accessing tracks 20 through 29, and so forth. For example, to select track 22, press the **+10** button twice, and then press the **2** button 3.

5 **Search Buttons:** Press these buttons to search forward ►► or backwards ◄◄ through a disc to locate a particular portion of the selection being played.

6 **Skip Buttons:** Press one of these buttons to move to the next track ►►|, or to move back to the previous track |◄◄ on the disc being played.

7 **Stop Button:** Press this button to stop the disc currently being played.

8 **Play Button:** Press this button to start the playback of a CD. If the CD drawer is open, pressing this button will automatically close the drawer.

9 **Random Button:** Press this button to put a disc into play, and to have all of the tracks played in a random order.

10 **Pause Button:** Press this button once to momentarily stop a disc. When the button is pressed again, the disc will resume play at the point it was stopped.

11 **Intro Button:** Press this button to put the FL8550 into the Intro Scan mode. When you press this button, the unit will play the first 10 seconds of each track on the disc, and then move to the next track. Press the button again to defeat the function and continue full play of the current track.

12 **Time Button:** Press this button to select the time display. In normal operation, the display will show the running time of the track being played. Press the button once to check the time remaining for the track in play. Press the button a third time to view the total play time remaining for the disc in play.

13 **Clear Button:** Press this button to remove tracks from a programmed sequence. Each press of the button will remove one track, starting with the last track programmed to play.

14 **Program Button:** This button is used to program the playback of a disc in a particular order.

15 **Repeat Button:** Press this button once to constantly repeat the track currently being played. Press it a second time to repeat the entire disc.

16 **Disc Skip Button:** Press this button to change to the next disc. If a disc position is empty, the FL8350 will automatically search for the next position that contains a disc.

Troubleshooting Guide

SYMPTOM	*CAUSE*	*SOLUTION*
No lights on front panel	• No AC power	• Make certain that the AC power cord is plugged into a live outlet.
Remote does not appear to operate	• Main Power Switch turned off • Weak batteries • Blocked sensor	• Turn on Main Power Switch. • Install fresh batteries, observing polarity indications. • Remove obstructions from the front panel sensor or connect a remote sensor to the **Remote In** jack on the rear panel.
Front panel lights, but CD does not play	• Disc upside down • Moisture inside unit	• Reload disc with label side facing up. • Leave the unit turned ON for 30 minutes to allow moisture to evaporate.
Play indicator lights, but no sound is heard	• Poor connections • Wrong source selected	• Make certain connections are secure and made to the correct (e.g., **CD**) input. • Select CD source on receiver or preamp.
Sound skips or stutters during play	• Disc may be damaged • Surface vibrations	• Try another disc. • Isolate the unit from vibration by placing it on a firm surface or move it further away from speakers.
Sound is continually distorted	• Incorrect input	• Make certain that the FL8550 is connected to a line-level audio input, NOT a digital audio or phono input.

harman/kardon Service Bulletin

Service bulletin # H/K9901 Rev1 November 2002 | Warranty Labor Rate: Major Repair

To: All harman/kardon Service Centers

Models: FL8350/FL8550

Subject: "No disc" reading in display

When a CD is in the carousel at the play position, Infra red light emitted by IR LED D3 is reflected onto IR Photo sensor D2. D3 and D2 are on the PCB located underneath the carousel. When the amount of IR light received by D2 is insufficient, D2 will not saturate and the display will read "No disc".

In the event you receive an FL8350 or FL8550 with the complaint: Display reads "No disc" but a disc is in the tray, perform the modification as listed below:

1) Lay the unit on a padded surface.
2) Remove the (7) Black Philips screws holding the Top Cover on; remove cover.
3) Lay unit on its side and remove (5) Black screws on bottom which hold front panel to chassis.
4) Lay unit upright, remove (2) Black screws at top front section holding front panel to the front tray retainer brackets.
5) Pull front panel away, cut plastic cable ties if necessary, and lay the front panel face down on the table.
6) Remove (4) tray retainer brackets, (1) Plated screw each. (Bracket on left side may have a ground terminal).
7) Pull the carousel tray up and out of the unit; turn upside-down to expose the sensor board.
8) Remove the (2) Plated screws holding the sensor board to tray.
9) Lift the board and unplug either molex connector CN1 or CN2 to be able to turn board upside-down.
10) Locate R1 and change from a 470Ω to a 750Ω resistor - h/k part# 1007-501316-000.
11) Locate R2 and change from a 750Ω to a 470Ω resistor - h/k part# 1004-701316-000.

Alternately, the two above parts may just be "swapped", as this will result in the correct values.

12) Locate D3 and replace with new infra-red LED - h/k part# 3100-204000-002.

REASSEMBLY:

13) Replace sensor board, screws, and CN1 or CN2 connectors.
14) Turn the carousel tray over and replace back in the track; tray must be positioned all the way at the rear of the unit. When placed correctly, tray should *not* glide back & forth on the track.
15) Replace and attach the (4) tray retainer brackets with single screws - ground wire (if present) is re-attached to left front bracket.
16) Replace the front panel, both with the (5) bottom screws and the (2) screws at the top. Note: Make sure any washers that were present between the various brackets and the chassis are reinstalled. Replace cable ties as necessary.
17) Test the player by inserting one or more compact discs, assure unit reads discs in all slots.
18) Locate MCU board, which is mounted vertically on right side of unit. Connect DC Multimeter to Pin 8 (gray wire) of CN705 (10 pin plug, labeled 'DSNS'), and Pin 2 (red wire) of CN701 (2 pin plug). While playing a disc, DC Multimeter reading must be between 4.7 V and 5.0 V.
19) Replace top cover and screws.

Model	Serial number (120V)	Serial number (230V)	Status	Action
FL8350 FL8550	YC0001-01001 to YC0001-37014 YC0003-01001 to YC0003-08666	YC0002-01001 to YC0002-16673 YC0004-01001 to YC0004-04884	Needs Modification	Replace: R1 with 750 Ω R2 with 470 Ω D3
FL8350 FL8550	YC0001-37015 and above YC0003-08667 and above	YC0002-16674 and above YC0004-04885 and above	Changed by factory	NONE REQUIRED

harman/kardon Service Bulletin

<u>Service bulletin # H/K2000-09 November 2000</u> | This is considered a Minor Repair

To: All harman/kardon Service Centers

Models: FL8350/FL8550

Subject: Carousel does not stop

In the event you receive an FL8350 or FL8550 with the complaint: "The carousel does not stop at a given disc position, …or passes disc positions intermittently", perform the modification listed below:

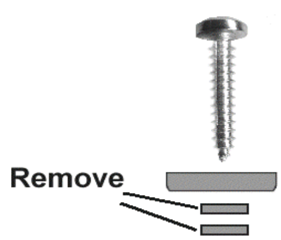
1) Lay the unit on a padded surface.
2) Remove the (7) Black Philips screws holding the Top Cover on; remove cover.
3) In the center of the carousel are a single screw and plated washer; remove these.
4) Underneath the larger plated washer are two smaller fiber washers. These are to be removed permanently.
5) Examine the larger plated washer carefully. Upon replacement of the larger plated washer and screw, make sure the slightly sharper, stamped edge of the washer is facing upwards.
6) Test the player by inserting one or more compact discs, assure the unit reads discs in all slots, and stops at all positions.

IF THIS MODIFICATION DOES NOT CORRECT THE PROBLEM

7) Lay unit on its side and remove (5) Black screws on the bottom, which hold the front panel to the chassis.
8) Lay unit upright, remove (2) Black screws at top front section holding front panel to the front tray retainer brackets.
9) Pull front panel away, cut plastic cable ties if necessary, and lay the front panel face down on the table.
10) In the center of the carousel, once again remove the single screw and plated washer.
11) Lift the carousel up and off the chassis, towards the front of the unit.
12) Turn the carousel upside-down; in the center is a hollow plastic post. Remove any excess lubricant with a clean dry cloth or paper towel, saving it for re-application. The end of this post must be filed down approximately 0.020" (0.5mm) with a file, Dremel tool, or similar tool. <u>Be sure not to remove too much material and keep the surface even (flat)</u>. Remove any debris or shavings when finished.
13) Spread and replace the saved lubricant on the new surface of the center post.

REASSEMBLY:

14) Replace the carousel and mounting screw + washer.
15) Replace the front panel, both with the (5) bottom screws and the (2) screws at the top. Note: Make sure any washers that were present between the various brackets and the chassis are reinstalled. Replace cable ties as necessary. Replace the top cover.
16) Test the player by inserting one or more compact discs, assure unit reads discs in all slots, and stops at all positions.





Model	Serial number (120V)	Serial number (230V)	Status	Action
FL8350 FL8550	All Serial numbers affected	All Serial numbers affected	May need modification	Remove small fiber washers in center screw of carousel; if necessary file center post down 0.020" (0.5mm)

harman/kardon TECH TIPS

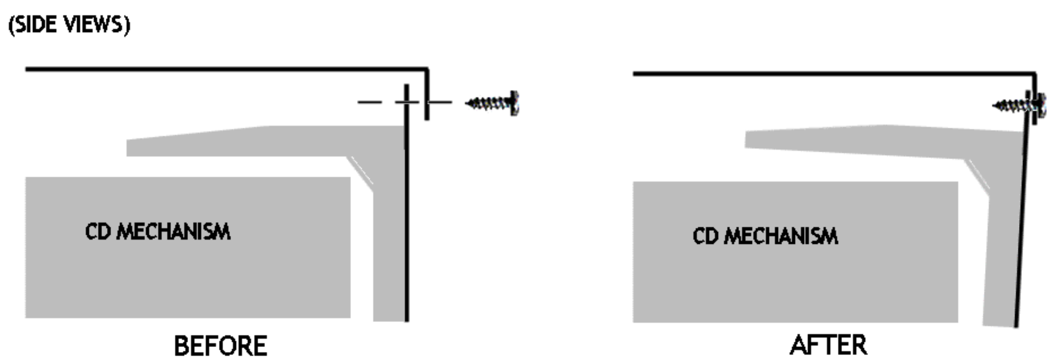
Troubleshooting tips and solutions to common service problems

For models: FL8350/FL8550/FL8380 **TIP# HKTT2003-06**

Complaint: Unit Will Not Play or Recognize a Disc, “Skipping”.

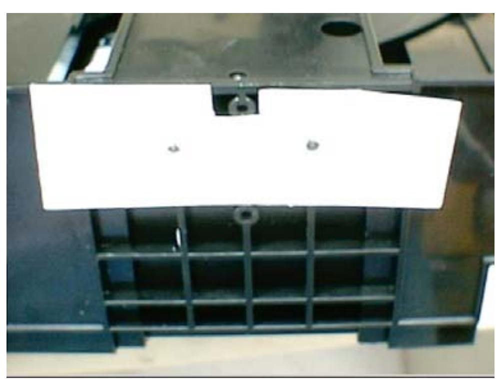
Possible Problem: Misalignment of the top cover and rear panel.

To test, attempt to play the unit with the top cover OFF. If symptoms persist, troubleshoot further. If the unit will play with the cover OFF, the problem is caused by a misalignment of the top cover and the rear panel. When the screws are tightened on the top cover, at the rear of the unit, the CD mechanism may “warp” upward in the area of the clamper arm, which causes a “Will not Play” symptom, which shows up as an unusual delay, with the word “Disc” in the display, after the “Play” button is pressed.



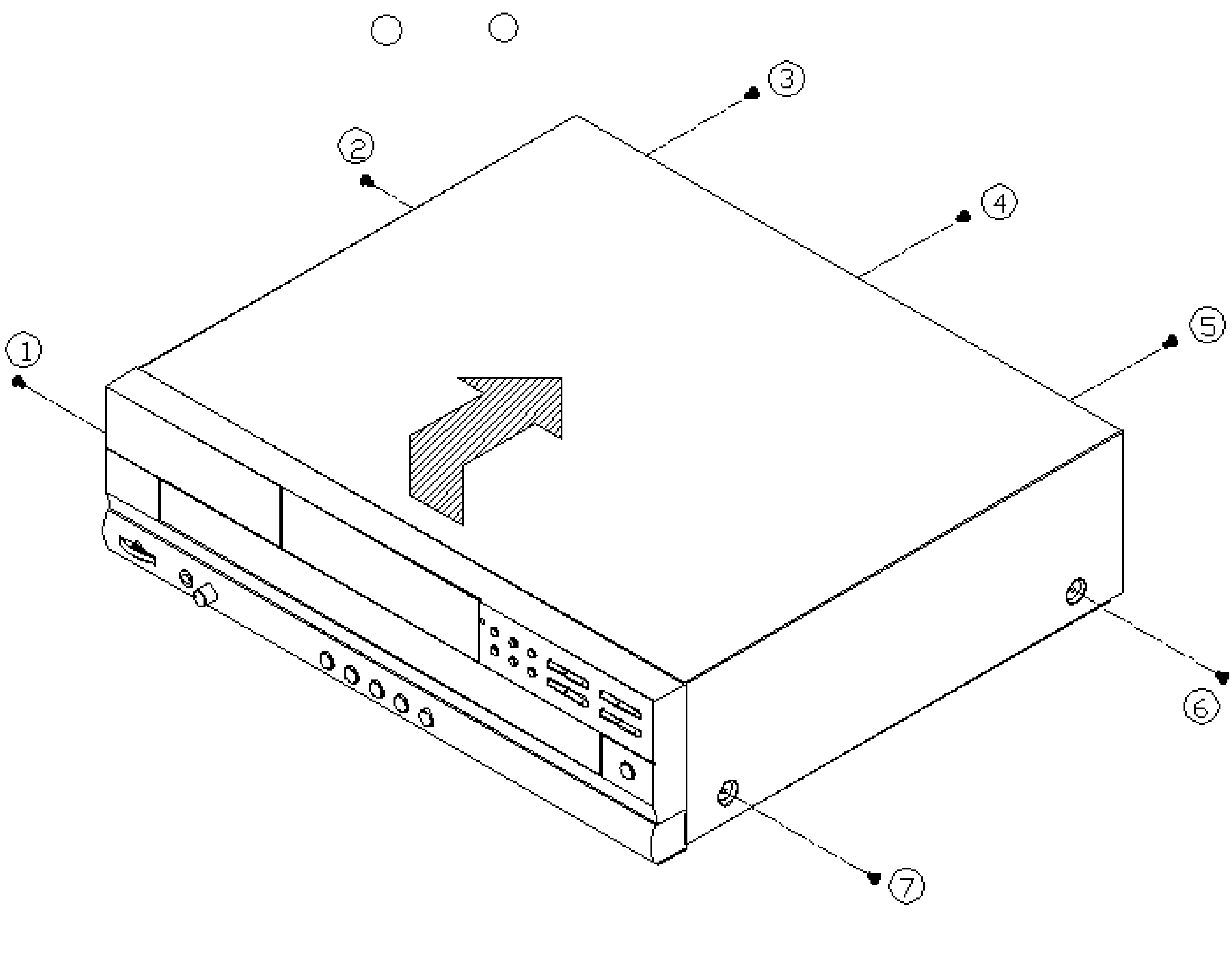
Solutions:

Washers can be added to the top rear screws to fill the gap between the top cover “lip” and rear panel. Alternately, a spacer can be constructed of fish paper, plastic sheet, or similar material, that will fit between the Disc Clamper and the inside of the rear panel. Choose thickness as necessary.



DISASSEMBLY INSTRUCTIONS

1. Removing the top cover.
1) Remove 7 screws (1 to 7) holding the top cover.

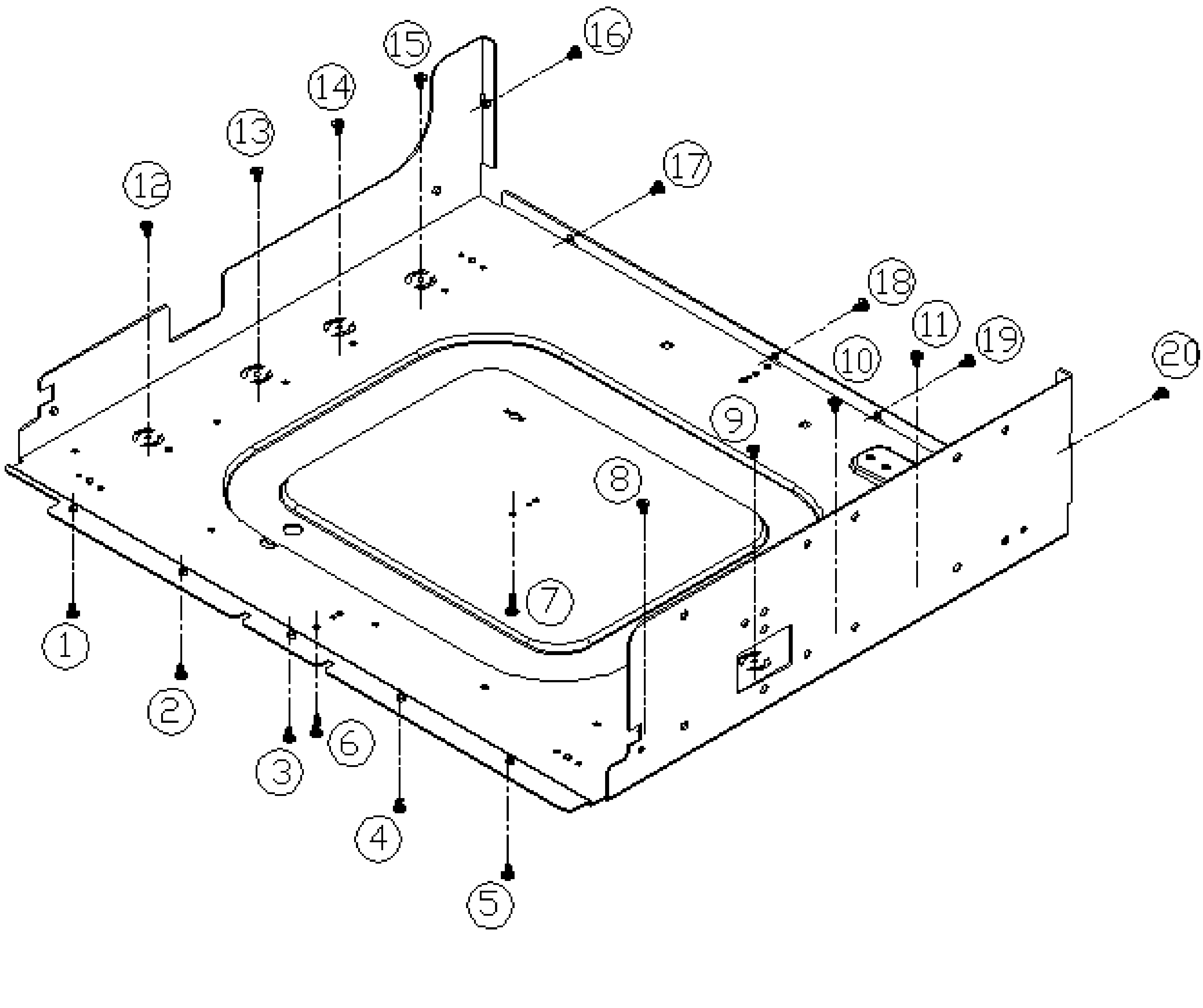


2. Removing the bottom cover.

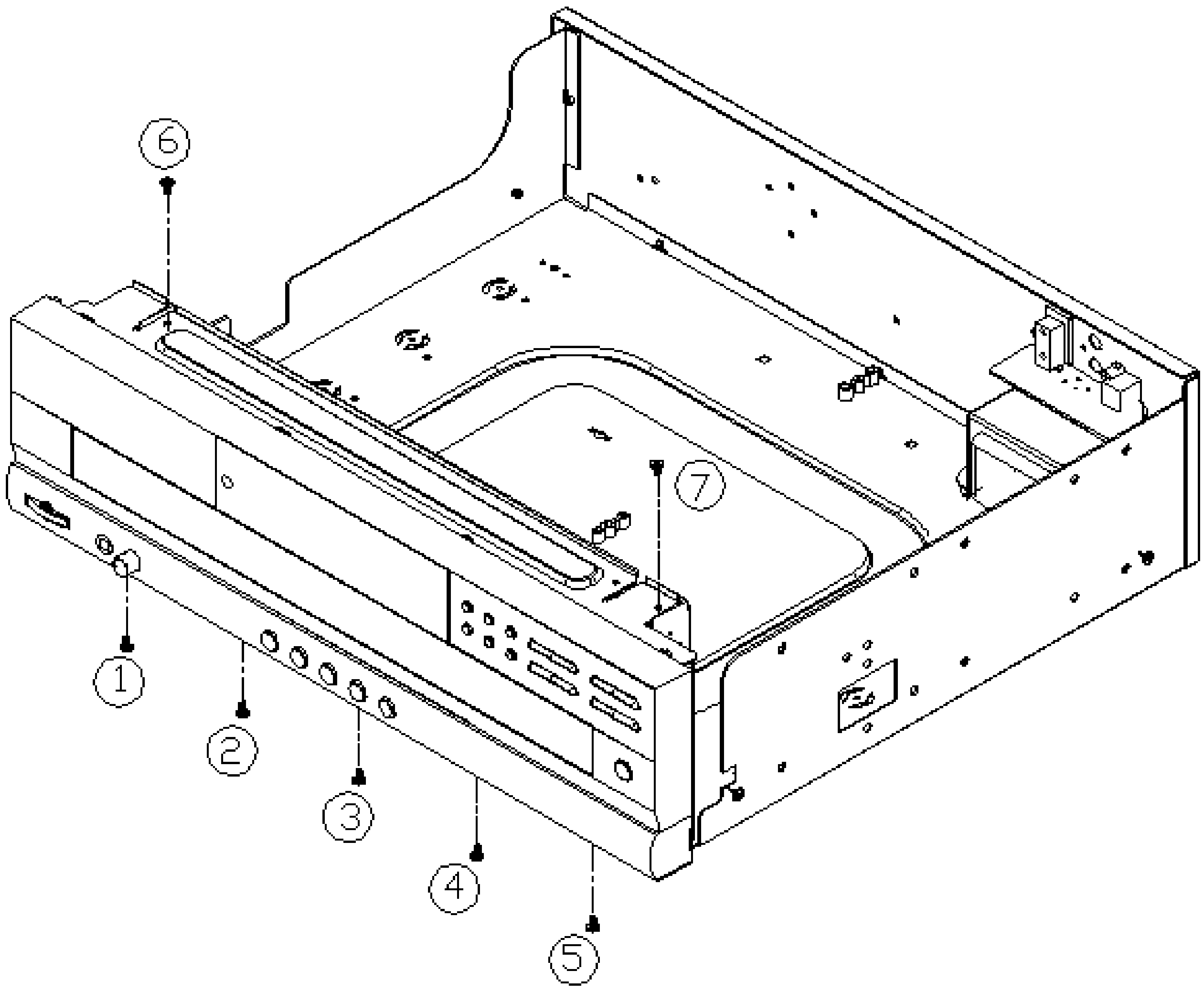
1) Turn the set over.

2) Remove 15 screws (① to ⑮) from the bottom chassis.

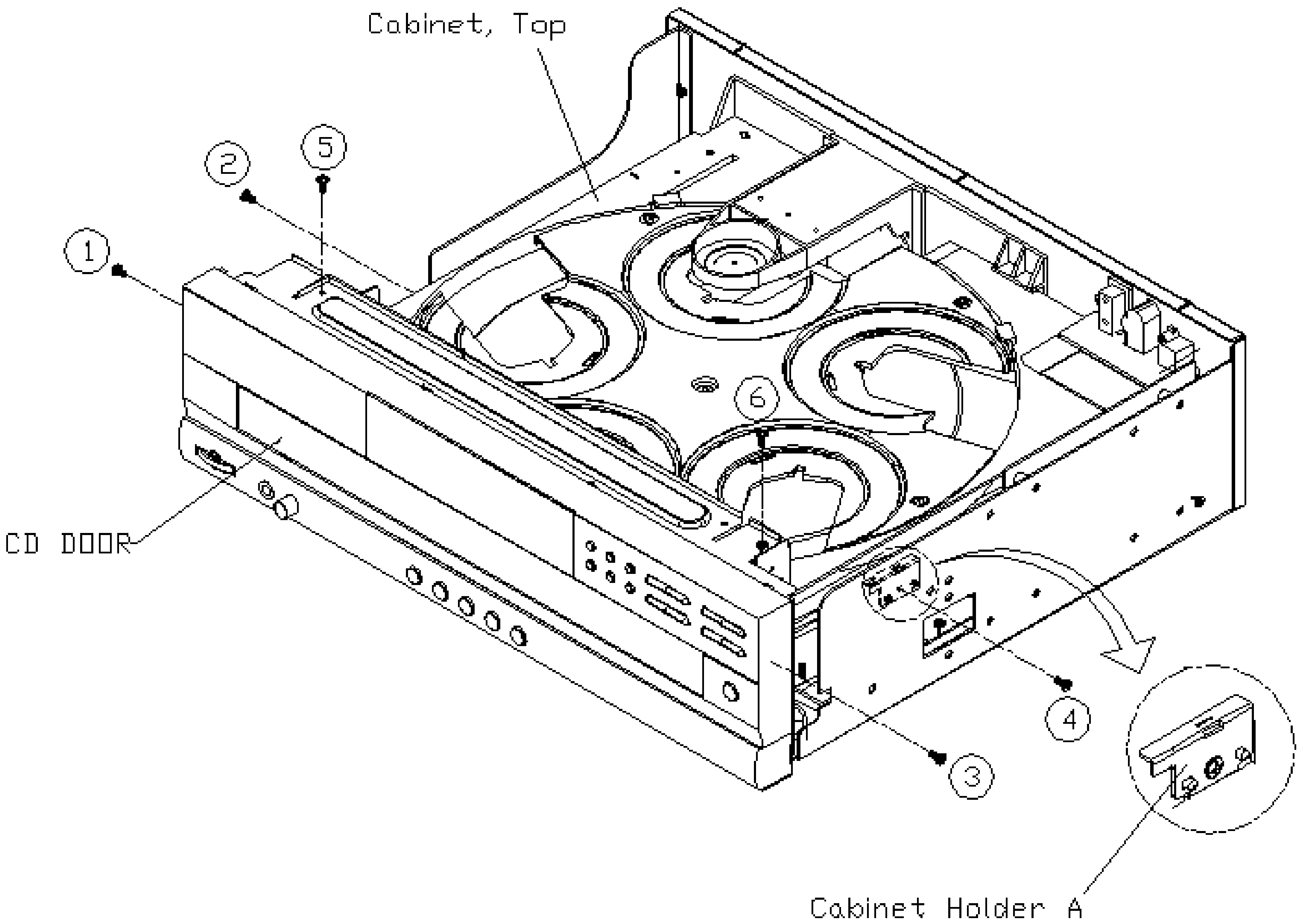
3) Remove 5 screws (⑯ to ⑳) from the back chassis.



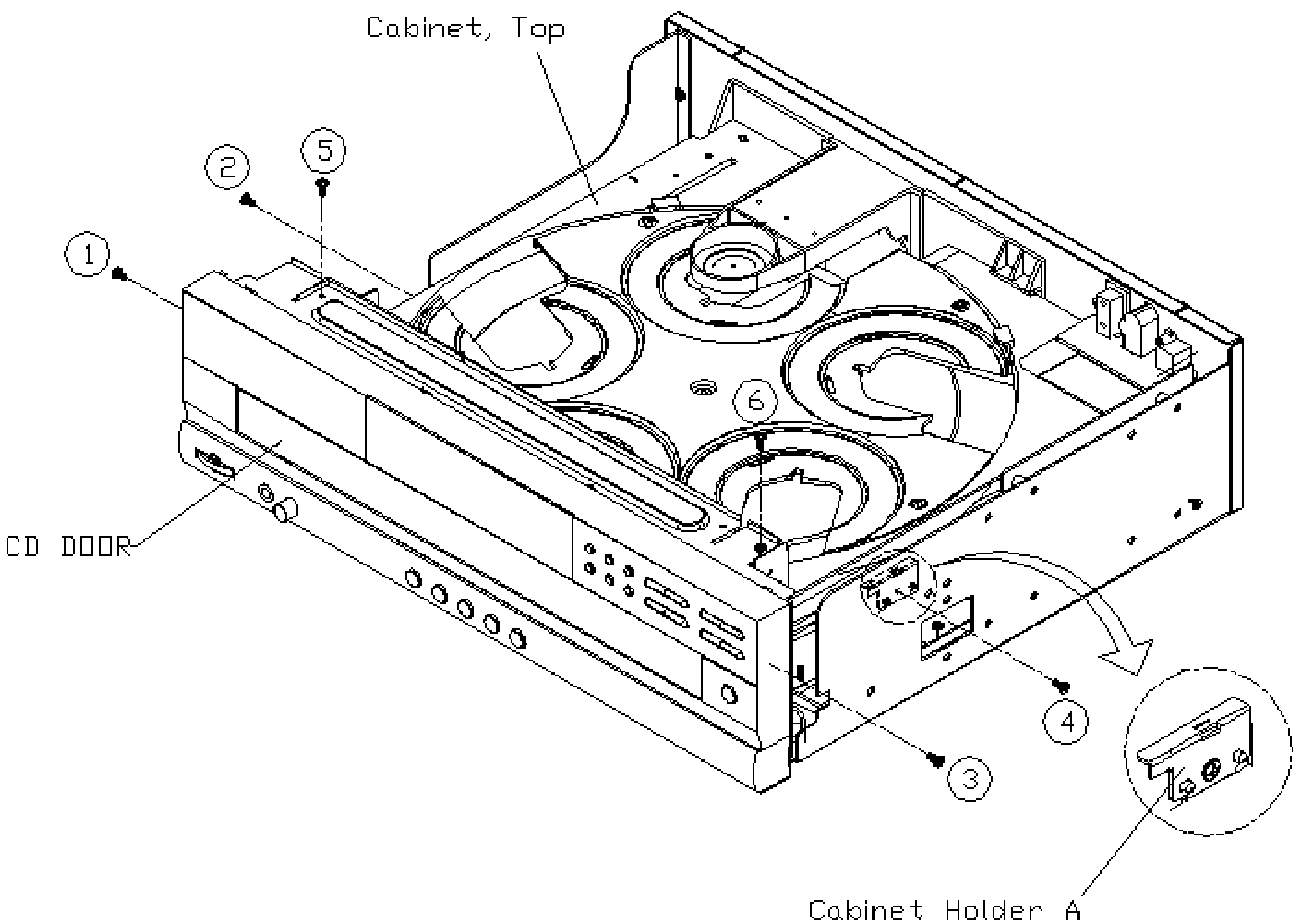
3. Removing the front panel.
1) Remove 5 screws (① to ⑤).
2) Remove 2 screws (⑥ to ⑦) from the metal of front panel.
3) Hold the front panel and pull it up.
4) Remove 2 connectors (CN501 , CN502) from the phones board.



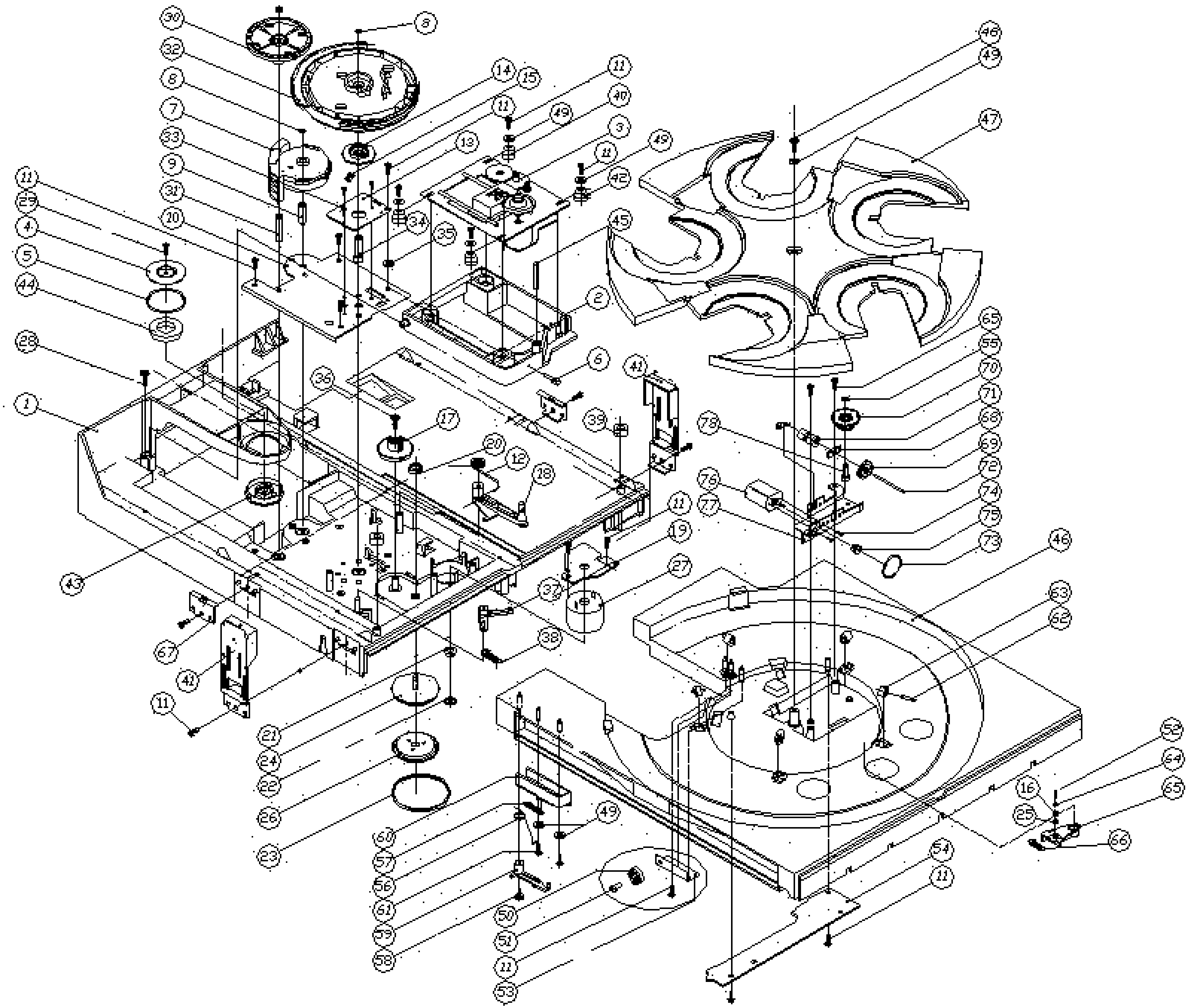
4. Removing the loading table (Cabinet,Top)
1) Remove 4 screws (① to ④) holding the Cabinet holder A & B.
2) Remove 2 screws (⑤ to ⑥) Holder the metal frame.
3) Remove the Cabinet Holder A and B.
4) Remove and hold the loading table up.
5) Disconnect the 6 pins wire connector from main PCB Assembly.



4. Removing the loading table (Cabinet,Top)
1) Remove 4 screws (① to ④) holdlng the Cablnet holder A & B.
2) Remove 2 screws (⑤ to ⑥) Holder the metal frame.
3) Remove the Cabinet Holder A and B.
4) Remove and hold the loadlng table up.
5) Disconnect the 6 pins wire connector from main PCB Assembly.



Exploded drawing of CD Changer mechanism



FL8550 Exploded Drawing List

Seq. No.	Part Number	Description	Qty
1	6583-510002-000-01	TOP CABINET, PAINTED	1.0
2	6583-510004-001	BRACKET, FRONT PANEL	1.0
3	6083-510002-000-01	HARMAN/KARDON FL8350&FL8550 TRAY DOOR(WSILKSCREEN)	1.0
4	9483-501000-111	FL8350 POWER CONTROL BOARD ASSY REV A	1.0
5	6600-010293-000	SPRING, POWER SWITCH	1.0
6	6083-510008-000	*LENS, POWER KNOB	1.0
7	6083-5100015-000	LIGHT SHEET BLACK	1.0
8	6083-510007-000-01	KNOB, POWER PAINTED	1.0
10	6583-510006-000	BRACKET, PHONES (MIC)	1.0
11	7107-212005-022	WASHER M7	1.0
12	7112-517506-022	WASHER M12	1.0
13	6600-120120-000	NUTS M12	1.0
14	6600-120070-000	NUTS M7	1.0
15	6083-510006-000-01	KNOB VR PAINTED	1.0
16	6083-510005-000-01	KNOB, PROGRAM PAINTED	1.0
17	6083-510001-002-02	HARMAN/KARONT FRONT PANEL W/SILKCREEN&P	1.0
18	6083-510003-000-01	HARMAN/KARDON FL8550 DISPLAY LENS (W SILKSCREEN)	1.0
19	6083-510004-000-01	KNOB, DISC PAINTED	1.0
20	9485-801000-261	FL8550 DISPLAY BOARD (VFD) ASSY REV A	1.0
21	6083-510010-000-01	HARMAN/KARDON FUNCTION KNOB (W SILKSCREEN&PAINTED)	1.0
22	6083-510009-000-01	HARMAN/KARDON 'EJECT' KNOB (W SILKSCREEN&PAINTED)	1.0
23	6583-510001-001	BOTTOM CABINET	1.0
24	6029-010012-000-01	PLASTIC FOOT (HOT STAMPING)	4.0
25	6600-070003-000	CD90R05 RUBBER PAD,LEG	4.0
26	6083-510014-000	*BRACKET, 5CD-SIDE 2	1.0
27	9483-501000-232	FL8350 MCU BOARD	1.0
28	6600-020010-000	CD420L01 PCB MOUNT.	4.0
29	9485-501000-291	FL8550 DIGITAL OUTPUT BOARD	1.0
30	6600-180007-000	AC CORD BUSHING (PG5RF-5B)	1.0
31	6600-120040-000	SCREW NUT M4X7X3	2.0
32	7104-010010-022	WASHER M4X10X1MM	3.0
33	3200-480140-401	TRANSFORMER EI48 117V CUL #4801Y44T-1 (WINBOND)	1.0
34	9485-501000-013	FL8550 CD MAIN BOARD ASSY	1.0
35	9600-505004-002	5CD MECHA ASSY FOR FL8350 REV B	1.0
36	6083-510013-000	*BRACKET, 5CD-SIDE 1	1.0
37	6083-510011-000	STAND, FRONT-5CD	2.0
38	6083-510012-000	STAND, REAR-5CD	1.0
39	2610-218300-002	AC POWER CORD NON-INTEGRAL SPT-2 UL/CSA	1.0
40	6583-510003-001-03	HARMAN/KARDON FL8550 R/P (117V FCC&CSA VR)	1.0
A	7003-006001-111	SCREW M3X6 S.T.P. B/H (BLACK)	22.0
B	7003-006002-112	SCREW M3X6 P.T.P. B/H	23.0
C	7003-008002-112	SCREW M3X8 P.T.P. B/H	16.0
D	7002-606010-062	SCREW M2.6X6 W/H	8.0
E	7004-010010-112	SCREW M4X10 B/H	2.0
F	7003-016002-112	SCREW M3X16 PTP B/H ZN	3.0

5CD EXPLODED DRAWING LIST

SEQ NO.	PART NO.	DESCRUPTION	QTY.
1	6005-050050-007	BASE, 5CD	1.0
2	6005-050010-004	BRACKET, CD MECHA	1.0
3	3009-901000-000	SANYO CD MECHANISM CD90V1	1.0
4	6590-050001-001	CD90 CHUCKING METAL PLATE	1.0
5	6600-140001-000	CD90F01 CHUCKING METAL PLATE FELT RING	1.0
6	6600-020200-002	PIN, ROUND	1.0
7	6005-050008-001	CONTROL CAM	1.0
8	7105-010005-030	WASHER LOCK 5X10X0.5MM	3.0
9	6600-020198-000	5CD PIN, CONTROL CAM	1.0
10	6505-050001-001	BRACKET GEAR	1.0
11	7003-008002-112	SCREW M3X8 B TYPE B/H ZN	12.0
12	6600-010211-000	5CD SPRING, LEVER LOCK, OUTER	1.0
13	4841-010700-006	TURNTABLE PCB REV. F	1.0
14	6005-050025-002	SWITCH COVER	1.0
15	6505-050007-001	CONTACT PLATE	1.0
17	6005-050009-000	INTERMEDIATE GEAR	1.0
18	6005-050014-004	LEVER LOCK, OUTER	1.0
19	4800-310210-001	LOADER BOARD VER A	1.0
20	6005-050011-000	IDLER GEAR	1.0
21	6005-050023-001	PULLEY MOTOR	1.0
22	6005-050024-000	PULLEY DISC	1.0
23	6600-090053-000	5CD BELT MOTOR LOADING	1.0
24	6005-050013-001	DRIVEN PULLEY (WHITE)	1.0
25	6005-050027-000	BUSH, ROLLER	1.0
26	6005-050012-000	DRIVEN PULLEY PLATE	1.0
27	RF-500TB-14415	DC MOTOR MABUCHI RF-500TB-14415 (DC002VT0000	1.0
28	7003-012002-062	SCREW M3X12 P.T.P. W/H	1.0
29	7002-605005-112	SCREW M2.6X5 CLASSI B/H ZN	1.0
30	6005-050007-000	GEAR, CABINET TOP	1.0
31	6600-020197-001	PIN CABINET TOP	1.0
32	6005-050006-004	CONTROL CAM	1.0
33	7002-006001-022	SCREW M2*6 S.T.P. P/H	2.0
34	6600-020196-002	PIN, CAM CABINET	1.0
35	7103-012010-022	WASHER M3X12X1MM	1.0
36	7003-008002-062	SCREWM3X8 P TYPE W/H ZN	1.0
37	6005-050015-000	LEVER LOCK	1.0
38	6600-010210-000	SPRING LEVER LOCK	1.0
39	6600-170021-000	5CD CUSHION RING	2.0
40	6600-170019-000	5CD CUSHION B	2.0
41	6600-020181-000	5CD SCREW, SPECIAL	4.0
42	6600-170018-000	5CD CUSHION A	2.0
43	6090-050002-004	CD90 CHUCKING PULLEY	1.0
44	6600-150006-001	CHUCKING MAGNET	1.0
45	6600-020199-001	PIN, LOCK	1.0
46	6005-050002-011	CABINET TOP	1.0
47	6005-050001-006	TRUNTABLE	1.0
48	7003-012002-062	SCREW M3X12 P.T.P. W/H	1.0
49	7103-012010-022	WASHER M3X12X1MM	1.0
50	6005-050017-000	ROLLER	1.0
51	6600-020202-000	5CD PIN, ROLLER	1.0

52	6600-020297-000	PIN ROLLER LOCK	1.0
53	6505-050005-001	BRACKET ROLLER	1.0
54	9400-501000-132	5CD SENSOR BOARD ASSY REV B	1.0
55	7103-006005-130	WASHER 3X6X0.5MM CUT	1.0
56	6600-010213-000	5CD SPRING, GEAR BLOCK ARM	1.0
57	6600-010212-002	5CD SPRING, GEAR BLOCK	1.0
58	7002-620002-062	SCREW M2.6X20 P TYPE W/H ZN	1.0
59	6005-050005-001	GEAR BLOCK ARM	1.0
60	6005-050004-003	GEAR BLOCK	1.0
61	7002-608002-002	SCREW M2.6X8 P.T.P W/H D6.5	2.0
62	6600-020203-000	5CD SHAFT, T.T. ROLLER	5.0
63	6600-080001-000	YN21R D03/04 PINCH ROLLER	5.0
64	6005-050028-000	WASHER, BUSH	1.0
65	6005-050026-002	LEVER LOCK, T.T.	1.0
66	6600-010290-001	SPRING LEVER LOCK	1.0
67	6505-050002-001	CABINET HOLDER A	2.0
68	6005-050019-000	SHAFT BUSHING	2.0
69	6005-050020-000	PULLEY ROTARY	1.0
70	6005-050021-000	GEAR ROTARY	1.0
71	6005-050022-000	GEAR WORM	1.0
72	6600-020268-000	SHAFT DIA. 2X34MM	1.0
73	6600-090052-000	5CD BELT ROTARY	1.0
74	7002-003010-111	SCREW M2X3 B/H (BLACK)	2.0
75	6005-050018-000	MOTOR PULLEY	1.0
76	FF130SH11340-2684A	MOTOR FF-130SH-11340-02684A (MABUCHI)	1.0
77	6505-050004-004	MOTOR BRACKET	1.0
78	6600-020201-001	SHAFT GEAR ROTARY	1.0
79	6505-050003-001	5CD CABINET HOLDER B	2.0

ADJUSTMENT PROCEDURES

Reference Disk for adjustments: Sony YEDS - 18

Mode: FL8550

Testing Equipment:

- **i.** 5020 Frequency Response Analyzer
- **ii.** Oscilloscope
- **iii.** Frequency Counter
- **iv.** Frequency Generator (Kenwood AG-203A)

Adjustment Procedure

(A) Focus Adjustment

i. Connect Jitter Meter between TP1 (R51) and Vref (J6), then play a CD disc.
ii. Adjust VR1 until Jitter Meter get the minimum point.
iii. Connect Oscilloscope as the same as the last step. Waveform will be read as diamond shape and voltage is about 1.1v as perfect. (see the figure 1)

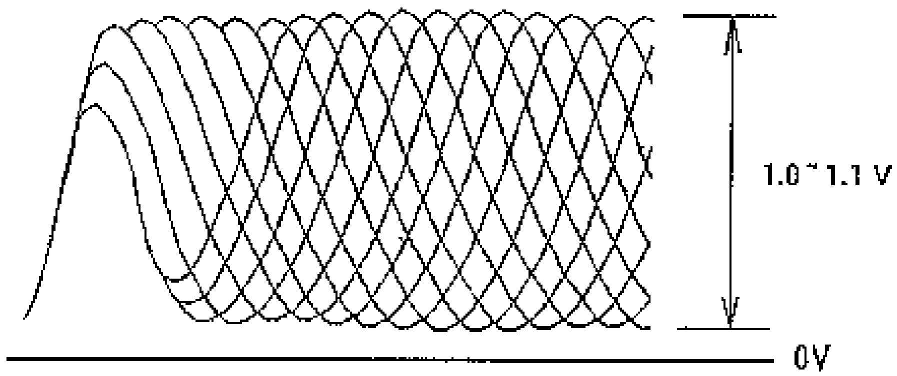


Fig. 1

(B) Tracking Adjustment

i. Connect oscilloscope to the test point TP3 (KA9220C) and Vref (J6).
ii. Press PLAY button and adjust VR4 to maximum and press SKIP DOWN button to make it Tracking off.
iii. Adjust VR2 to get symmetrical waveform height. After adjust VR4 to center.
iv. The result is show as below fig. 2

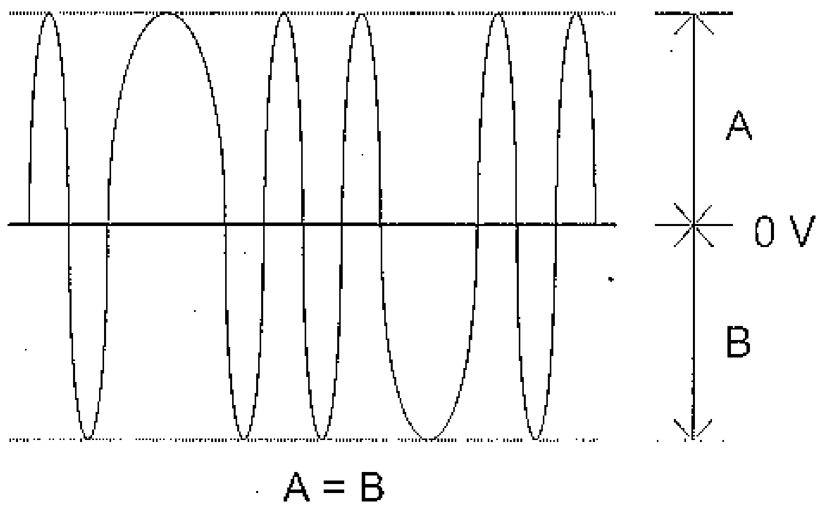


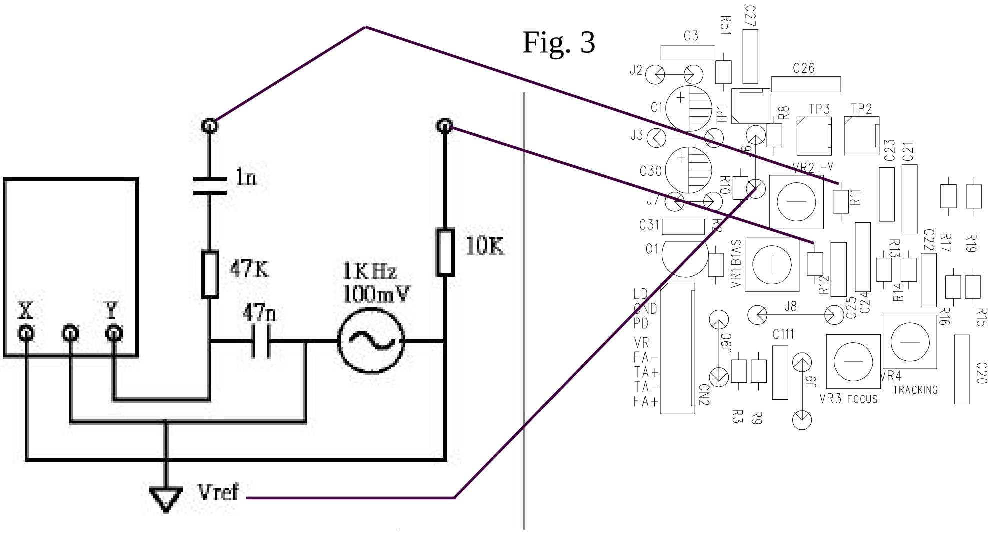
Fig. 2

(C) Focus Servo Loop Gain Adjustment

Connection point	Settings	State	Adjustment Location
U1 (KA9220C) Pin 57 (R11) Pin 56 (R12) See fig 3	1. Oscilloscope Probe: x 10 2. Oscilloscope setting CH1: 20mV/division CH2: 10mV/division Remark: X-Y mode	Play State	Adjustment VR3

i. Set the frequency generator output to 1KHz and 100mv.
ii. Press the play key and press skip key to move the pickup to halfway across the disk (R=35mm).
iii. Adjustment VR3(focus gain) so that the Lissajous waveform is symmetrical above the X axis and the Y axis.

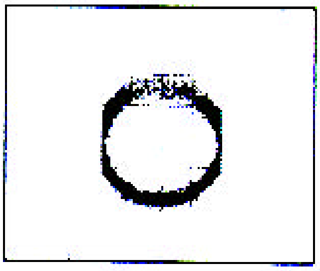
Fig. 3



Focus Gain Adjustment



Higher gain



Optimum gain



Lower gain

(D) Tracking Servo Loop Gain Adjustment

Connections point	Settings	State	Adjustment location
U1 (KA9220C) Pin 53 (R13) Pin 52 (R14) See fig.4	1. Oscilloscope probe: X10 3. Oscilloscope setting CH1: 50mV/division CH2: 20mV/division Remark: X-Y mode	Play State	Adjustment VR4

i. Set the frequency generator output to 1KHz and 100mV.
ii. Press the play key and press skip key to move the pickup to halfway across the disk (R=35mm).
iii. Adjustment VR4(track gain) so that the Lissajous waveform is symmetrical above the X axis Y axis.

Tracking Gain Adjustment

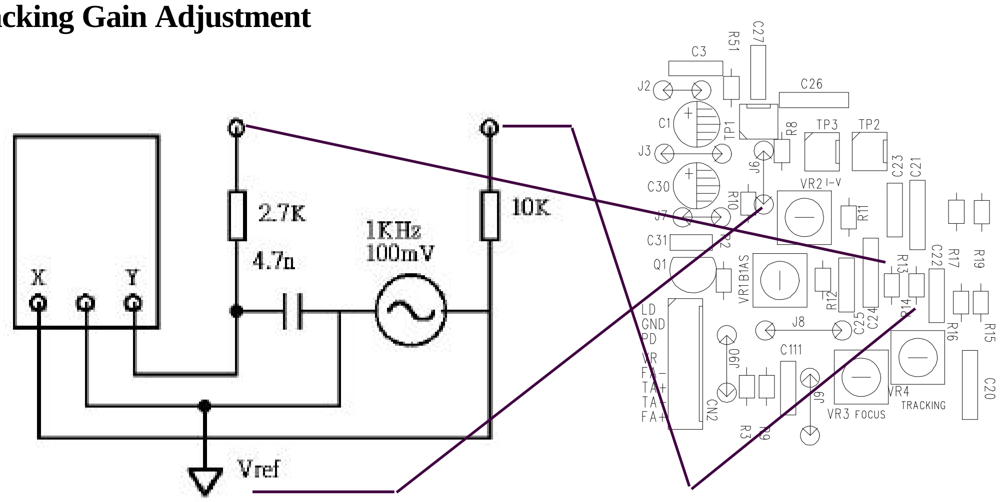
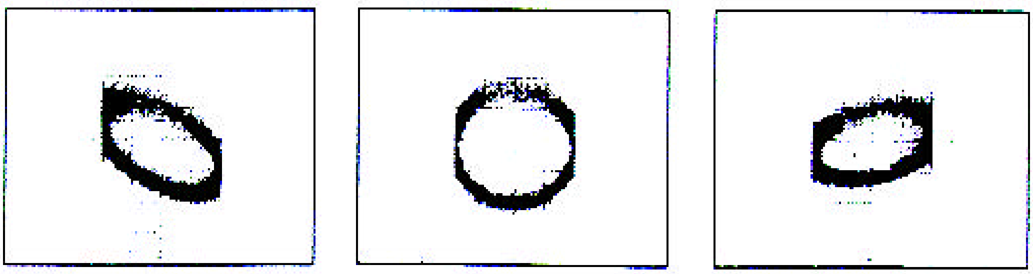


Fig 4



Higher gain   Optimum gain   Lower gain

Audio Characteristics Test Procedure

Test Equipment

1. 3346 CD Player Evaluating Filter x 2 (NF Electronic Instrument)
2. VP7722 Panasonic Audio Analyzer
3. Sony YEDS18 Test CD disc

Procedure

Equipment Setup

1. The audio output of the CD player under test is connected to the CD filter L & R inputs.
2. The outputs from the filter are connected to the Audio Analyzer.

Check the output Voltage

1. Set the mode of the filter to 'THRU'
2. Set the mode of Audio Analyzer to 'LEVEL' mode
3. Select track 2 of the test disc and play the CD disc
4. The output voltage and gain of the R & L channels are taken by pressing the respective buttons on the control board of Audio Analyzer.

Frequency Response

1. Set the mode of the filter to reference level mode.
2. Select the track 3, 4, 5, and 6 of the test disc and run it under 'Play' mode.
3. Check the output of the R & L Channels

Total Harmonic Distortion

1. Set the mode of the filter to 'DIST/CH-SP' mode
2. Set the audio analyzer to 'DIST' mode.
3. Set the unit of the audio analyzer to '%' mode
4. Select the track 2, 4, and 5 on the test disc and run them under 'PLAY' mode
5. Check the % of each R & L channels

Signal to Noise Ratio

1. Set the mode of the filter to ‘ S/N’ mode
2. Play track 2 of the test disc
3. The unit of the audio analyzer is set to dB mode
4. Press the S/N key on the control panel of the audio analyzer
5. Play track 7
6. Measure the data of S/N ratio

Dynamic Range

1. Set the mode of the filter to ‘ D-Range’ mode
2. Set the audio analyzer to ‘ DIST’ Mode
3. Set the unit of the audio analyzer to ‘ dB’ mode
4. Play track 17of the test disc
5. The dynamic range should be |A| + 60dB

Channel Separation

1. Set the mode of the filter to ‘ DIST/CH-SP’ mode
2. Set the audio analyzer to ‘ LEVEL’ mode
3. Play the tracks 8, 9, 10 & 11
4. The measured results is the difference between L & R channel

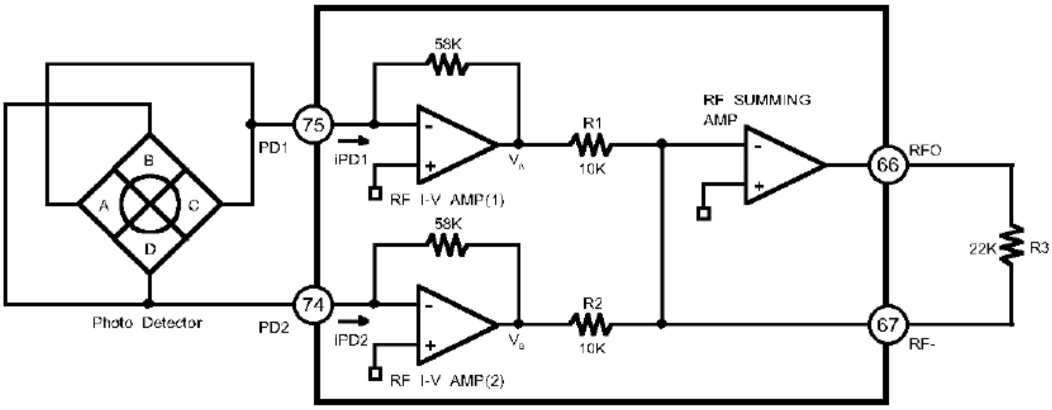
De-emphasis

1. Press the ‘ THRU’ button of the CD filter
2. Play the track 2 of the test disc
3. Press the ‘ Relative Level’ and make it ‘ ON’
4. Select the track 12 and 13 and measure the L & R channels value

Circuit Description

1. RF AMP BLOCK

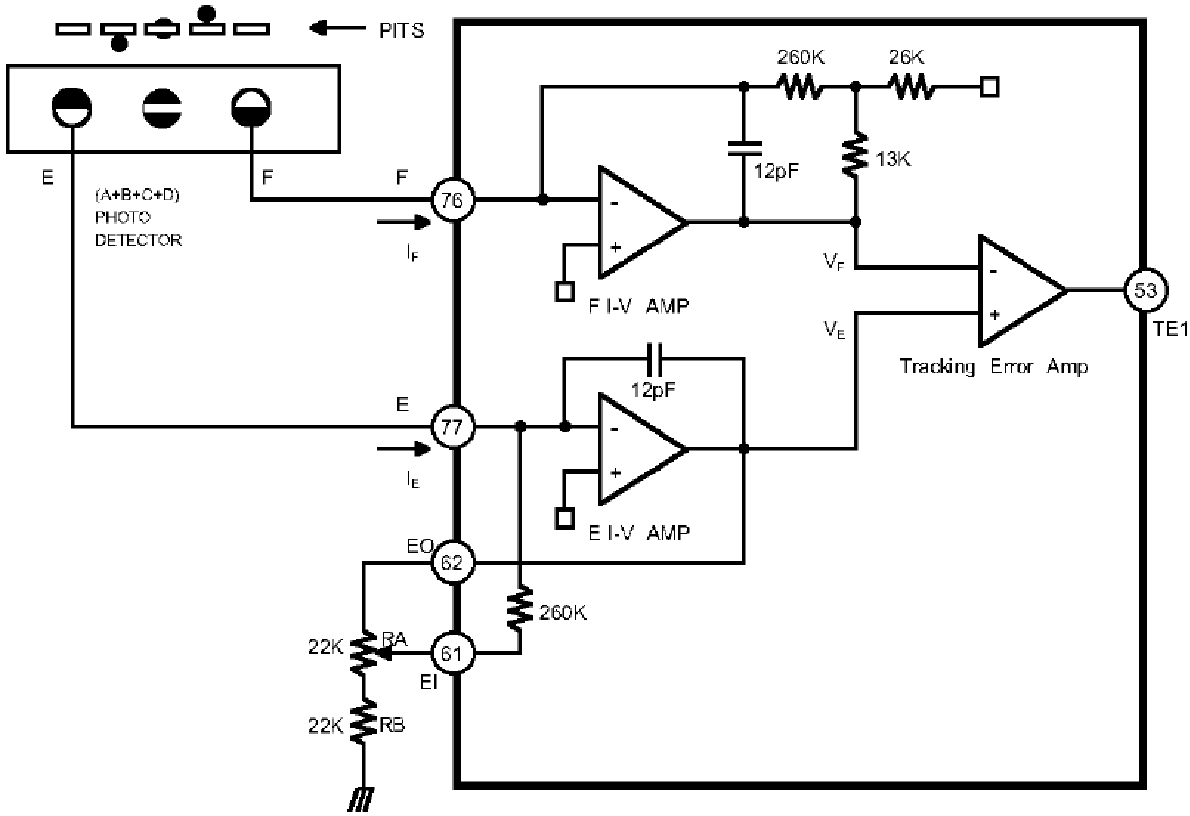
The KA9220 is designed for 3-spot type optical pick-up assembly. The photo detector is composed of 6 light sensor (A through F). The photo detector A, B, C and D detect audio modulation signal on the disc and generate focus error signal.



RF I-V AMP (1) and RF I-V AMP (2) are converted current of PD1 (A + C) and PD2 (B + D) through the 58 Kohm Internal resistor into Voltage.
Furthermore, they are added to RF Summing amplifier.
This signal (A + B + C + D) is outputted from RFO (Pin66).
The output Voltage is as follow.

$$
\begin{aligned}
V_{RFO} &= -R3 \text{ X } (iPD1 + iPD2) \\
&= -R3 \text{ X } \left(\frac{V_A}{R1} + \frac{V_B}{R2}\right) \\
&= -22K \text{ X } \left(\frac{V_A}{10K} + \frac{V_B}{10K}\right) \\
&= -2.2 \text{ X } (V_A + V_B)
\end{aligned}
$$

2. TRACKING ERROR AMPLIFIER



The output of photo detector F is directed to the (-) Input of F I – V AMP and out of photo detector E is directed to the (-) input of E I – V AMP.

These input signals are current.

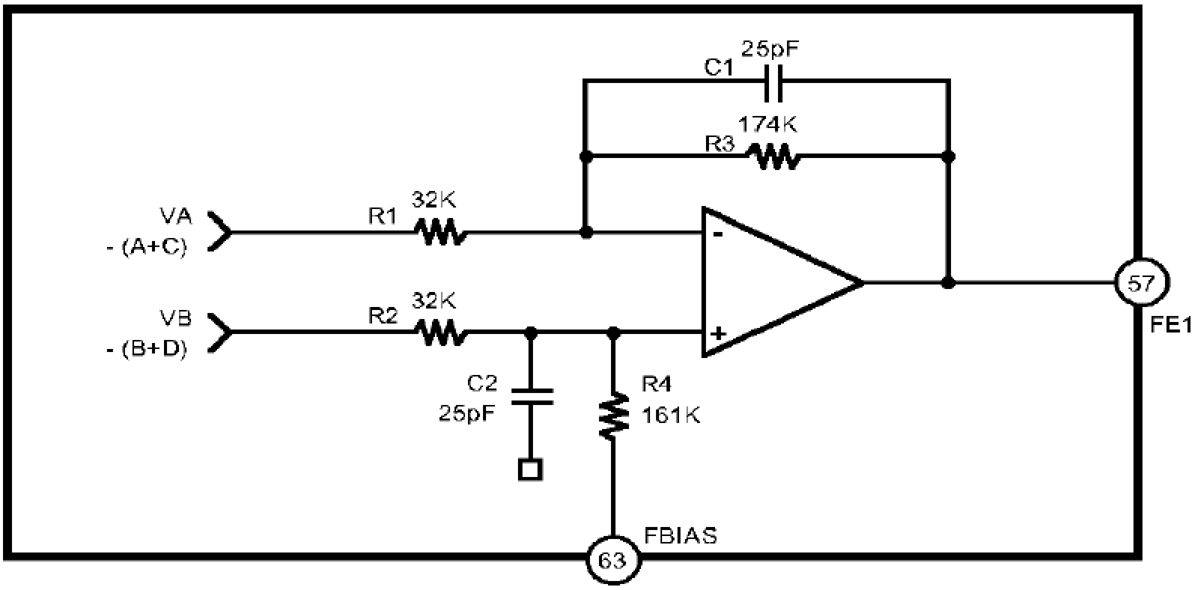
E I – V AMP and F I – V AMP are converted into voltage from the current signal. When correct tracking, two input (V_F, V_E) signals are equal. The occurrence of tracking error is due to difference between F I – V AMP output and E I – V AMP output.

$$V_F = I_F \times [(\frac{260K \times 13K}{26K}) + 273K = I_F \times 403K]$$

$$V_E = I_E \times [\frac{R_A}{R_B + 22K} + 260K + R_A + 260K]$$

accordingly, $V_{TE1} = (I_E - I_F) \times 1290K$

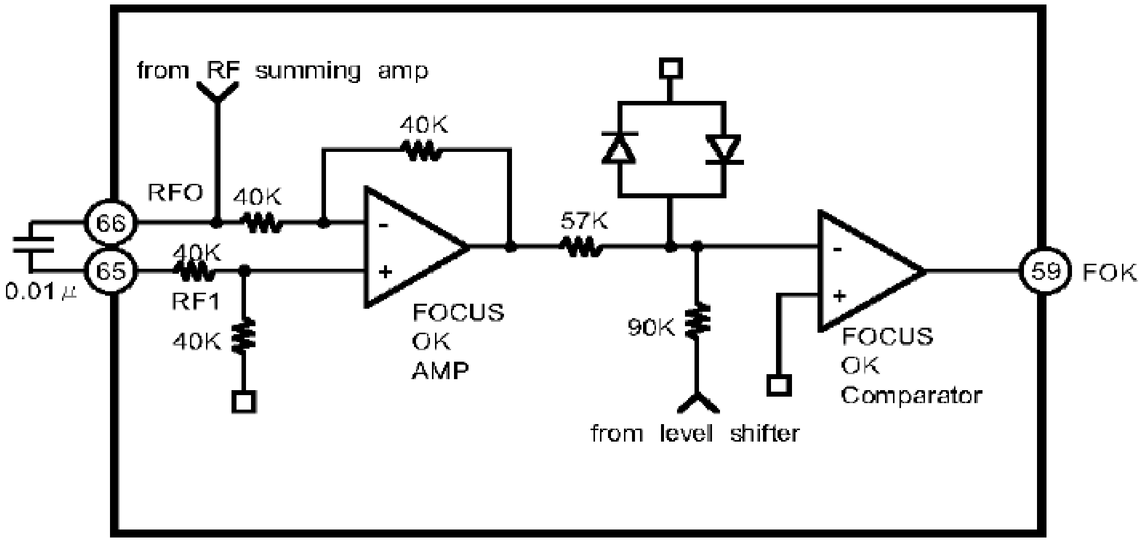
3. FOCUS ERROR AMPLIFIER



The focus error amp is the difference between RF I – V AMP (1) output V_A and RF I – V AMP (2) output V_B. This two (V_A, V_B) signals are each applied to the (-) and (+) input of focus error amp. As the result of differential voltage, Focus error signal is appeared at FE1 Pin (Pin57). This FE1 Output Voltage (low frequency) becomes (A + C) – (B + D), as follow V_{FE1} = R1/R3 (V_B – V_A)

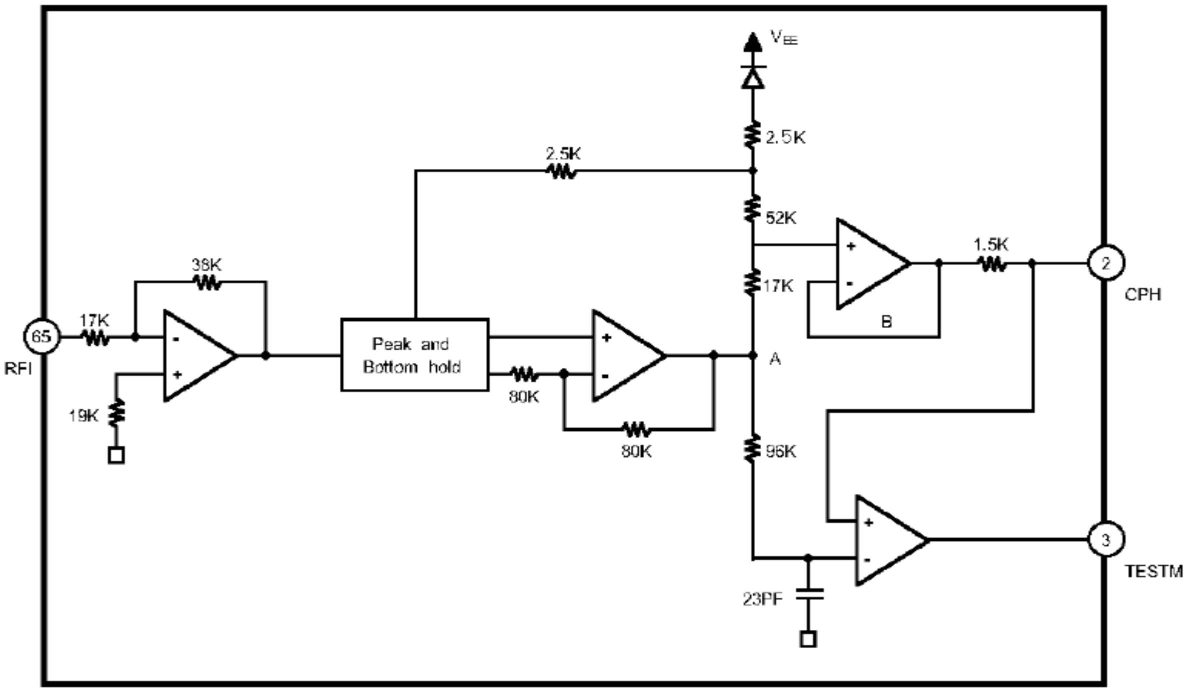
The focus error voltage is directed to the focus servo Block, to maintain optimum focusing at all times.

4. FOCUS OK GENERATION CIRCUIT



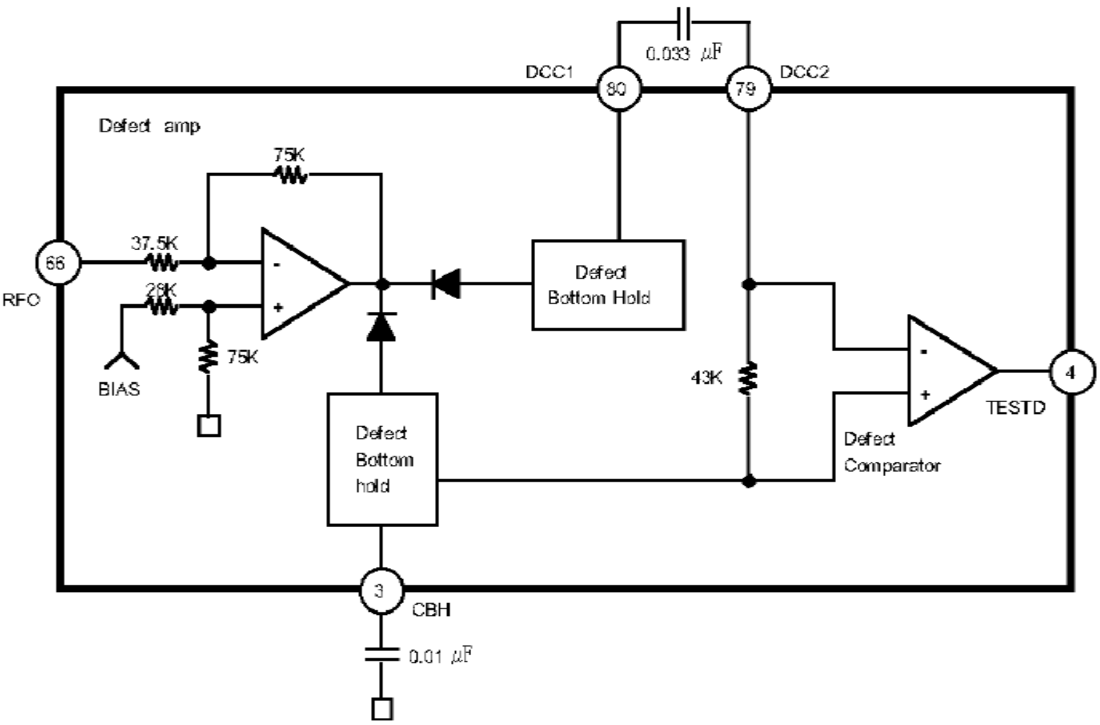
The focus OK circuit generates a timing window to monitor focus search status of focus servo. When RFO (Pin 66) Voltage is more than –0.37V, the focus OK circuit is inverted. Time constant of HPF in EFM comparator and in mirror circuit and that of LPF in focus OK circuit are determined bu capacitor (0.01µF) between RFI and RFO.

5. MIRROR CIRCUIT



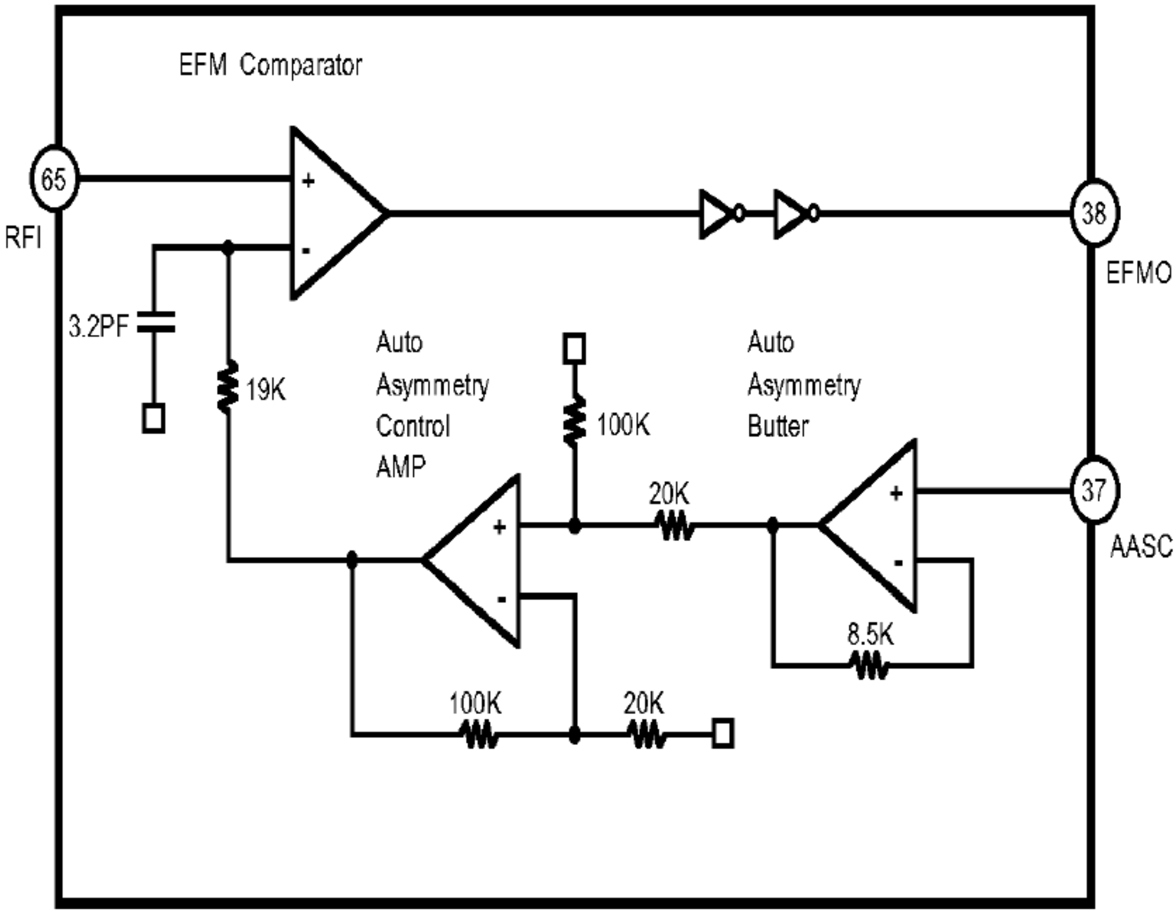
After RF input signal is amplified by Mirror amp, it is held in Bottom and Peak hold circuit. Such a hold is determined by the time constant. Envelope signal A (demodulated to DC) is two-thirds of the peak value of this signal. The time constant of A signal is held when it is larger than that of B signal. Therefore, mirror output is; Low at track on disc, High at between tracks on disc, High when defect is detected.

6. DEFECT CIRCUIT



The bottom hold has had two time constant of long and short, after than the RFI signal inverted. The short time constant of bottom hold is generated shorter than 0.1m sec of disc mirror defect, and long time constant is generated by previous mirror level. Mirror defect detection signals are generated by differentiation on Capacitor Coupling, and then transfer level.

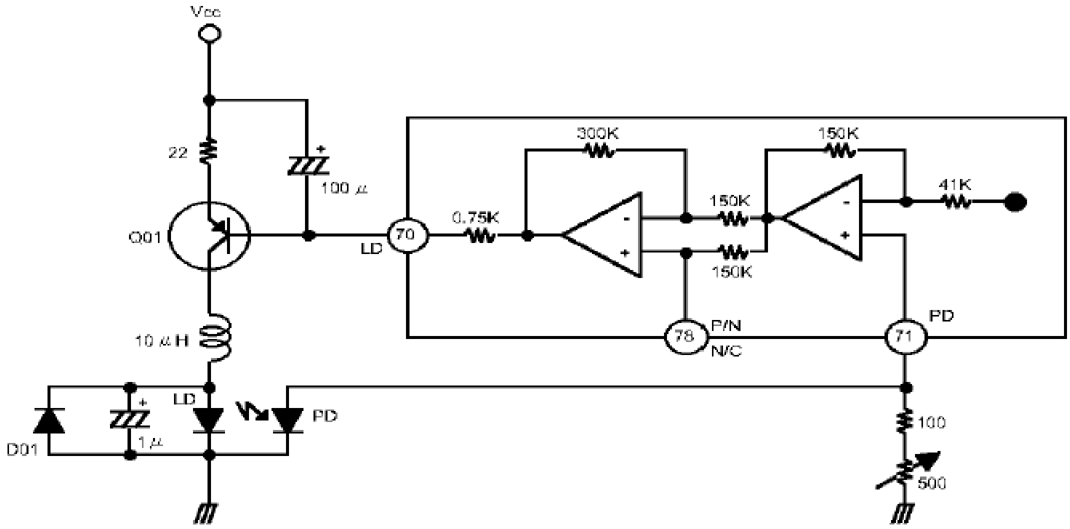
7. EFM COMPARATOR



The EFM Comparator converts a RF signal into a binary signal. A processing of disc production is occurred disproportion because of modification of disc. That is not reduced by only AC coupling. The reference voltage of EFM comparator is controlled utilizing the fact that the generation-probability 1, 0 is 50% (duty) in the binary EFM signal.

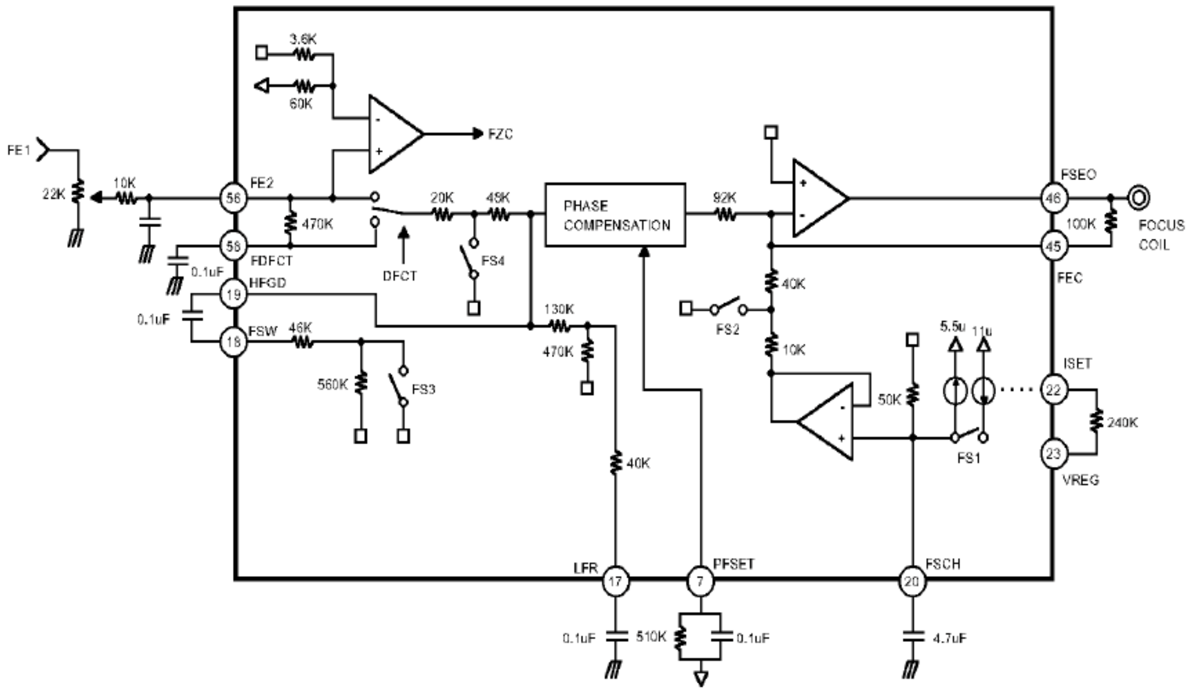
8. APC (AUTOMATIC POWER CONTROL) CIRCUIT

As the Laser diode has had large negative temperature characteristic when it does something for regularly supply current on laser diode. Therefore, the output on processing monitor photo diode must be controlled current for getting regularly output power.



SERVO BLOCK

1. FOCUS SERVO

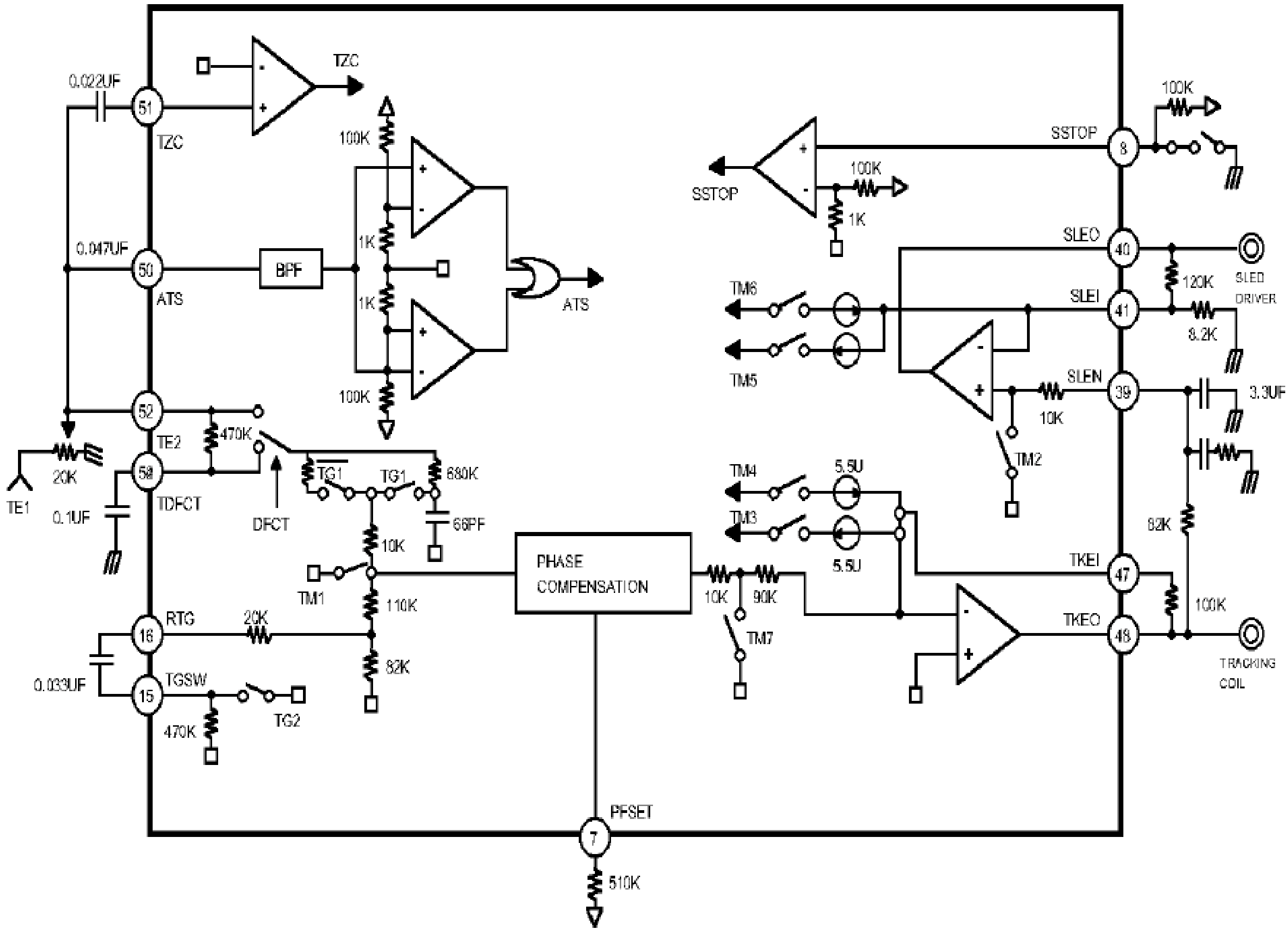


When the defect signal is detected, the focus servo Loop is isolated. At this time, the focus servo error output is outputted through low pass filter formed by connecting a capacitor (0.1µF) between the built-in 470KΩ resistor and FDFCT Pin (Pin58). Accordingly, the focus error output is held as just before error value during the defect.

The peak frequency of the focus phase compensation is at about 1.2KHz when the resistor connected to PFSET(Pin7) is 510KΩ. It is inversely proportional to the resistor connected to the Pin 7.

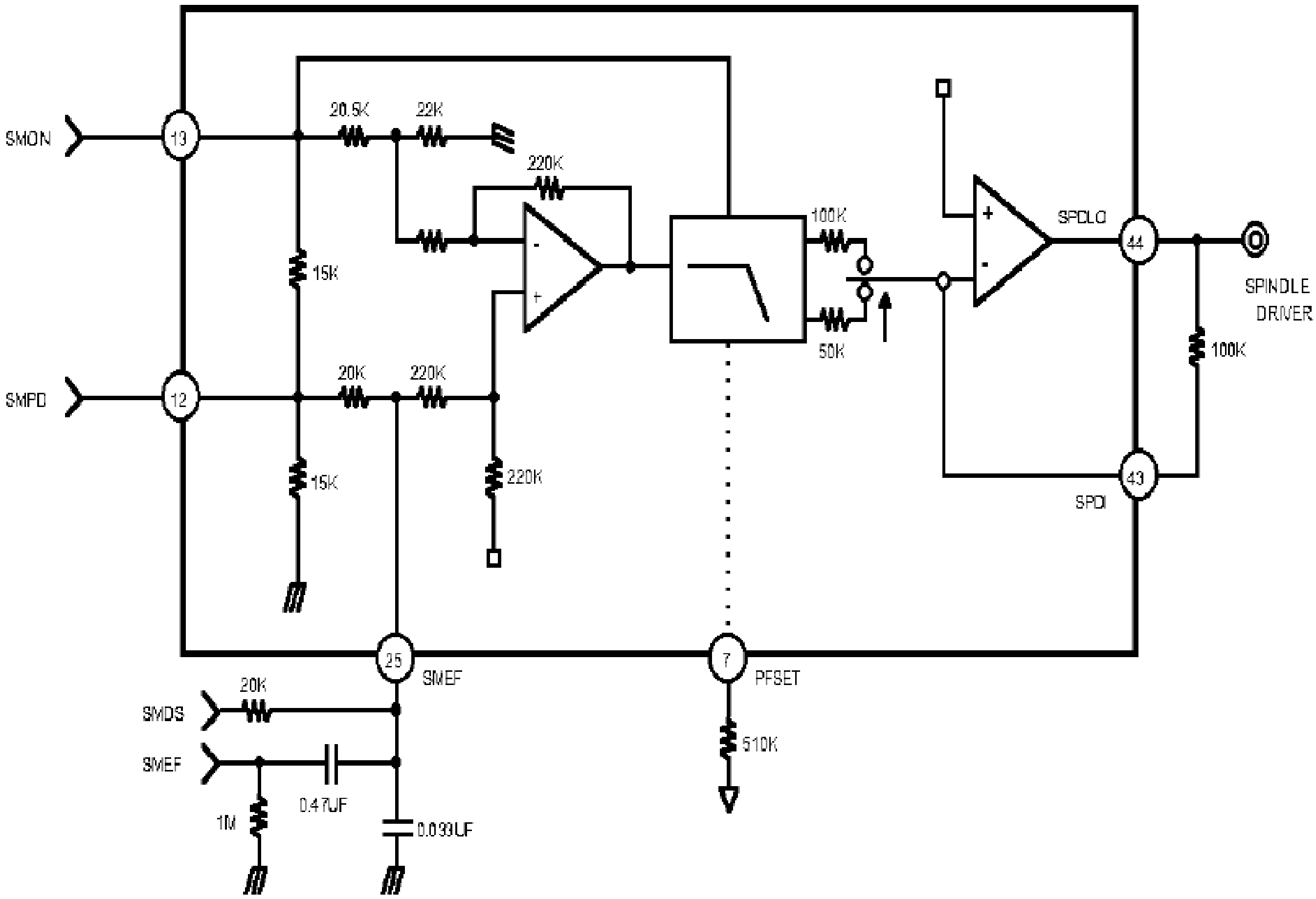
While the focus search is operating, the FS4 switch is ON and then focus error signal is isolated, accordingly it is outputted by FSEO Pin (Pin48). When the FS2 switch is ON, the focus servo Loop is on and then focus error is outputted through the focus servo Loop.

2. TRACKING AND SLED SERVO LOOP



The capacitor across RTG (Pin16) and TGSW (Pin15) reduces high frequency gain when the TG2 switch is OFF. The Peak frequency of the tracking phase compensation is at about 1.2KHz when the resistor connected to PFSET (Pin7) is 510KΩ. It is inversely proportional to the resistor connected to the Pin 7. The tracking error signal is switched into low pass filter route formed by connecting a capacitor between the built-in resistor at DFCT (470KΩ) and TDFCT (Pin54) as for tracking error signal.

3. SPINDLE SERVO AND LOW PASS FILTER



The 0.033nF and 20KΩ connected to SMEF (Pin 25) form the 200Hz low Pass filter. And the carrier component of spindle servo error signals is eliminated. In the CLV – S mode, SMEF becomes L and Pin25 LPF fc lowers, strengthening the filter further.

KA9258D

4-Channel Motor Driver

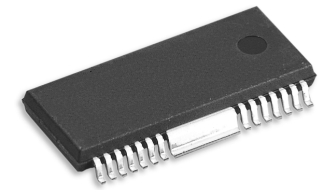
Features

- 1-phase, full-wave, linear DC motor driver
- Output gain adjustable
- Built in OP-amp
- Built in mute function
- Built in level shift circuit
- Built in thermal shutdown circuit (TSD)
- Operating range 6~13.2V

Description

The KA9258D is a monolithic integrated circuit, suitable for 4-CH motor driver which drives tracking actuator, focus actuator, sled motor and loading motor of CD/CD-ROM/ DVD system, and can also drive spindle motor of CD system.

28-SSOPH-375



Typical Applications

- Compact disk player (CDP)
- Video compact disk player (VCD)
- Automotive compact disk player
- Other compact disk media

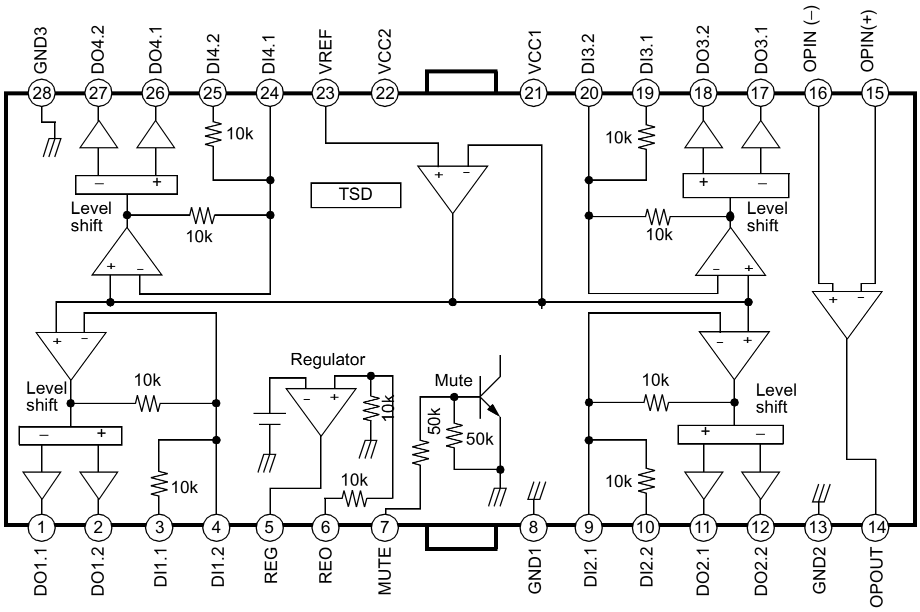
Ordering Information

Device	Package	Operating Temp.
KA9258BD	28-SSOPH-375	–40°C ~ +85°C
KA9258BDTF	28-SSOPH-375	–40°C ~ +85°C

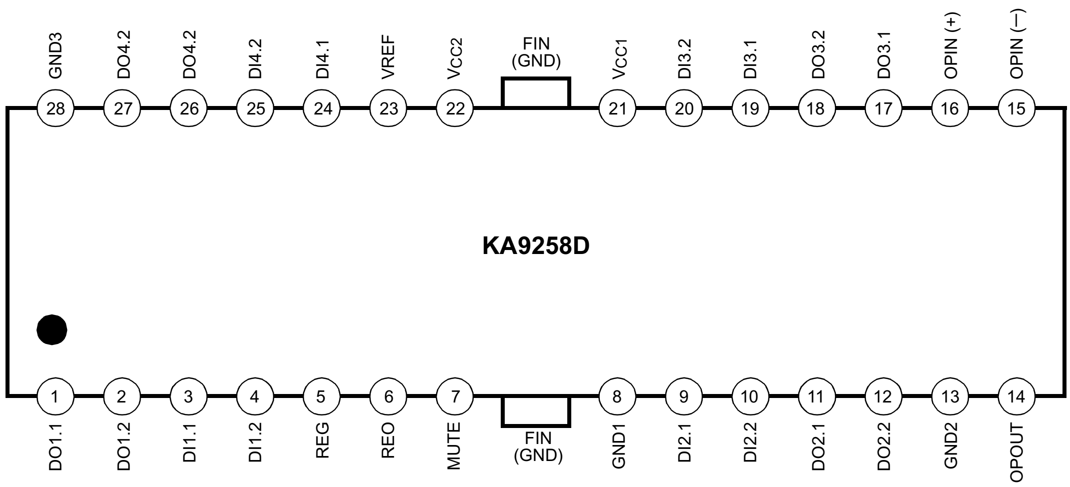
Pin Definitions

Pin Number	Pin Name	I/O	Pin Function Description
1	DO1.1	O	Drive output
2	DO1.2	O	Drive output
3	DI1.1	I	Drive input
4	DI1.2	I	Drive input
5	REG	-	Regulator
6	REO	O	Regulator output
7	MUTE	I	Mute
8	GND1	-	Ground 1
9	DI2.1	I	Drive input
10	DI2.2	I	Drive input
11	DO2.1	O	Drive output
12	DO2.2	O	Drive output
13	GND2	-	Ground 2
14	OPOUT	O	Op-amp output
15	OPIN(–)	I	Op-amp input (–)
16	OPIN(+)	I	Op-amp input (+)
17	DO3.1	O	Drive output
18	DO3.2	O	Drive output
19	DI3.1	I	Drive input
20	DI3.2	I	Drive input
21	V_{CC1}	-	Supply voltage
22	V_{CC2}	-	Supply voltage
23	VREF	I	2.5V bias voltage
24	DI4.1	I	Drive input
25	DI4.2	I	Drive input
26	DO4.1	O	Drive output
27	DO4.2	O	Drive output
28	GND3	-	Ground 3

Internal Block Diagram



Pin Assignments

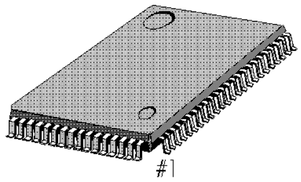


KA9220C

INTRODUCTION

The KA9220C is an 1-Chip BICMOS integrated circuit to perform the function of RF AMP and SSP (Servo Signal Processor) for Compact disc player applications.
It consists of RF signal processing, focus servo, tracking servo, sled servo control, EFM detecting and automatic power control circuits.

80 - QFP - 1420C



FEATURES

- RF Amplifier
- Focus Error Amplifer
- Tracking Error Amplifier
- Mirror Detector
- Focus OK etector
- EFM Comparator and Auto-Asymmetry control Amplifier
- Defect Detector for improvement to playability
- Built-in APC (Automatic power control) Amplifier
  (Focus, Tracking, sled, spindle servo control)
- Built-in Autosequencer
- Anti-shock function
- The function of preventing sled run away
- Double speed operation available
- Operating supply Voltage range: 3.4 ~ 5.5V

ORDERING INFORMATION

Device	Package	Operating Temperature
KA9220C	80-QFP-1420C	-20°C~ +75°C

BLOCK DIAGRAM

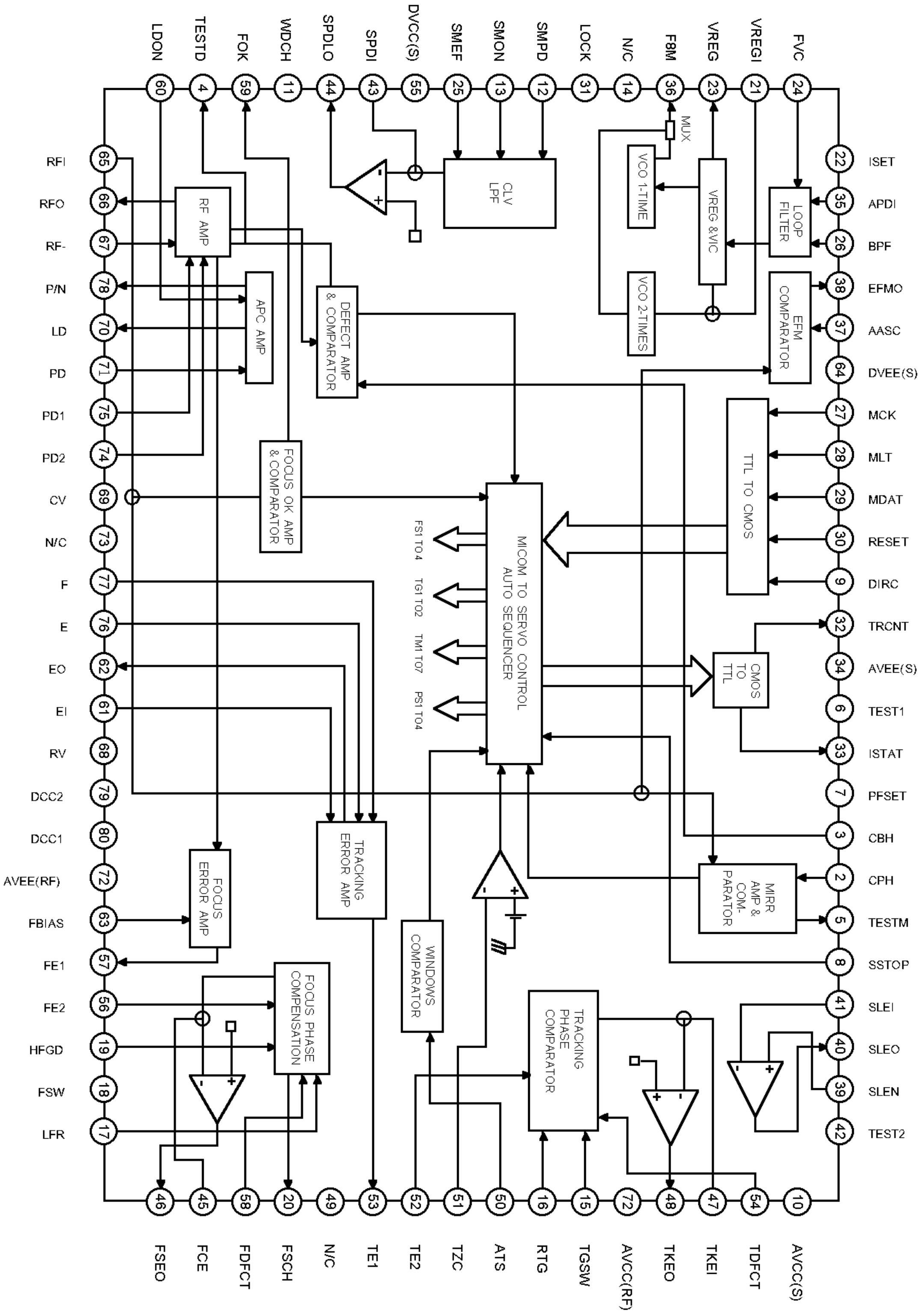


Fig. 1

PIN DESCRIPTION

Pin No	Symbol	Description
1	AVEE (R)	Analog negative power supply input pin for RF part
2	CPH	Capacitor connection pin of mirror hold.
3	CBH	Capacitor connection pin of defect bottom-hold
4	TESTD	Defect test pin
5	TESTM	Mirror test pin
6	Test1	Input pin for test
7	PPSET	Peak frequency setting pin for focus, tracking compensation and fc (cut off frequency) of CLV LPF.
8	SSTOP	Check the position pin of pick-up whether inside or not.
9	DIRC	Direct 1 Track Jump Control Pin
10	AVCC (S)	Analog positive power supply input pin for SERVO part.
11	WDCH	Auto-sequencer clock-input pin (Normal speed = 88.2KHz, Double speed = 176.4KHz)
12	SMPD	Connection pin of DSP SMPD
13	SMON	Connection pin of DSP SMON, spindle servo ON at “H”
14	N/C	No connection pin
15	TGSW	Providing time constant to change the high frequency tracking gain
16	RTG	Capacitor connection pin to switch the tracking gain of high frequency
17	LFR	Capacitor connection pin to perform rising low bandwidth of focus servo loop
18	FSW	High frequency gain of focus servo loop can be changed by FS3 switch ON or OFF
19	HFGD	Reducing high frequency gain with capacitor connected between pini18 and pin19
20	FSCH	Time constant external pin to generate focus search waveform
21	VREGI	External regulator voltage input pin for VCO
22	ISET	Determing the peak value of focus search, track jump and SLED kick

PIN DESCRIPTION (CONTINUED)

Pin No	System	Description
23	VREG	3.5V Regulator output pin
24	N/C	No connection pin
25	SMEF	Providing an external LPF time constant of CLV SERVO Loop
26	N/C	No connection Pin
27	MCK	Clock input pin from micom
28	MLT	Latch input pin from micom
29	MDAT	Data input pin from micom
30	RESET	Reset input pin from micom, reset at “L”
31	LOCK	Pin for operation of the sled runaway prevention function at “L”
32	TRCNT	Track count output pin
33	ISTAT	Internal status output pin
34	AVEE (S)	Analog negative power supply input pin for SERVO part
35	N/C	No connection
36	N/C	No connection
37	AASC	Auto-Asymmetry control input pin
38	EFMO	EFM comparator output pin
39	SLEN	Non-inverting input pin of SLED SERVO amplifier
40	SLEO	Output pin of SLED SERVO amplifier
41	SLEI	Inverting input pin of SLED SERVO amplifer
42	TEST2	Test input pin to change speed mode Normal speed = “H”, Double speed = “L”
43	SPDI	Inverting input pin of spindle servo amplifier
44	SPDLO	Spindle servo amplifier output pin
45	FCE	Inverting input pin of focus servo amplifier.

PIN DESCRIPTION (Continued)

Pin No	System	Description
46	FSEO	Output pin of focus servo amplifer
47	TKEI	Non-inverting input pin of tracking servo amplifier
48	TKEO	Output pin of tracking servo amplifier
49	N/C	No connection
50	ATS	Anti-shock input pin
51	TZC	Tracking Zero Crossing input pin
52	TE2	Tracking Error Servo input pin
53	TE1	Output pin of tracking Error Amplifer
54	TDFCT	Capacitor Connection pin for Defect Compensation of tracking servo
55	DVCC (S)	Digital positive power supply input pin for servo part
56	FE2	Focus error servo input pin
57	FE1	Output pin of focus error Amplifer
58	FDFCT	Capacitor connection pin for defect compensation of focus servo
59	FOK	Output pin of Focus OK comparator.
60	LDON	Laser diode ON/OFF control pin
61	EI	Feedback input pin of E I-V amplifier
62	EO	Output pin of E I-V Amplifier
63	FBIAS	Bias pin of non-inverting input of focus error amplifier
64	DVEE (S)	Digital negative power supply input pin for servo part
65	RFI	Output Signal of RF summing amplifier is inputed through capacitor
66	RFO	Output pin of RF summing amplifier
67	RF-	Inverting input pin of RF summing amplifier
68	RV	Output pin of (AVCC + AVEE)/2 Voltage
69	CV	Bias input pin of Center Voltage buffer

PIN DESCRIPTION (CONTINUED)

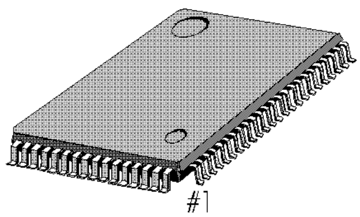
Pin No	System	Description
70	LD	Output pin of APC amplifier
71	PD	Input pin of APC amplifier
72	AVEE (R)	Analog positive power supply input pin for RF part
73	N/C	No connection
74	PD2	Inverting input pin of RF I-V AMP2
75	PD1	Inverting input pin of RF I-V AMP1
76	F	Inverting input pin of F I-V AMP
77	E	Inverting input pin of E I-V AMP
78	P/N	Selecting P - sub/N - sub of Laser diode
79	DCC2	Defect bottom - hold output is inputed through capacitor
80	DCC1	Output pin of defect bottom - hold

KS9284

INTRODUCTION

The KS9284 is a CMOS integrated circuit designed for the digital audio signal processor.
It is a monolithic IC that builts in 16K SRAM and DPLL.
It is similar to KS9284 IC but has advanced error correction ability.

80-QFP-1420C



FEATURES

- EFM data demodulation
- Built-in frame sync detection, protection and insertion circuit
- C1:2 - Error correction, C2:4 - Erasure correction
- Interpolation
- Subcode data serial output
- CLV servo controller
- Tracking counter
- Micom interface
- Built-in 16K SRAM
- Digital audio output (TX)
- Built-In digital PLL and analog PLL
- Double speed function
- Single power supply: +5V

ORDERING INFORMATION

Device	Package	Operating Temperature
KS9284	80-QFP-1420C	- 20°C~ + 75°C

BLOCK DIAGRAM

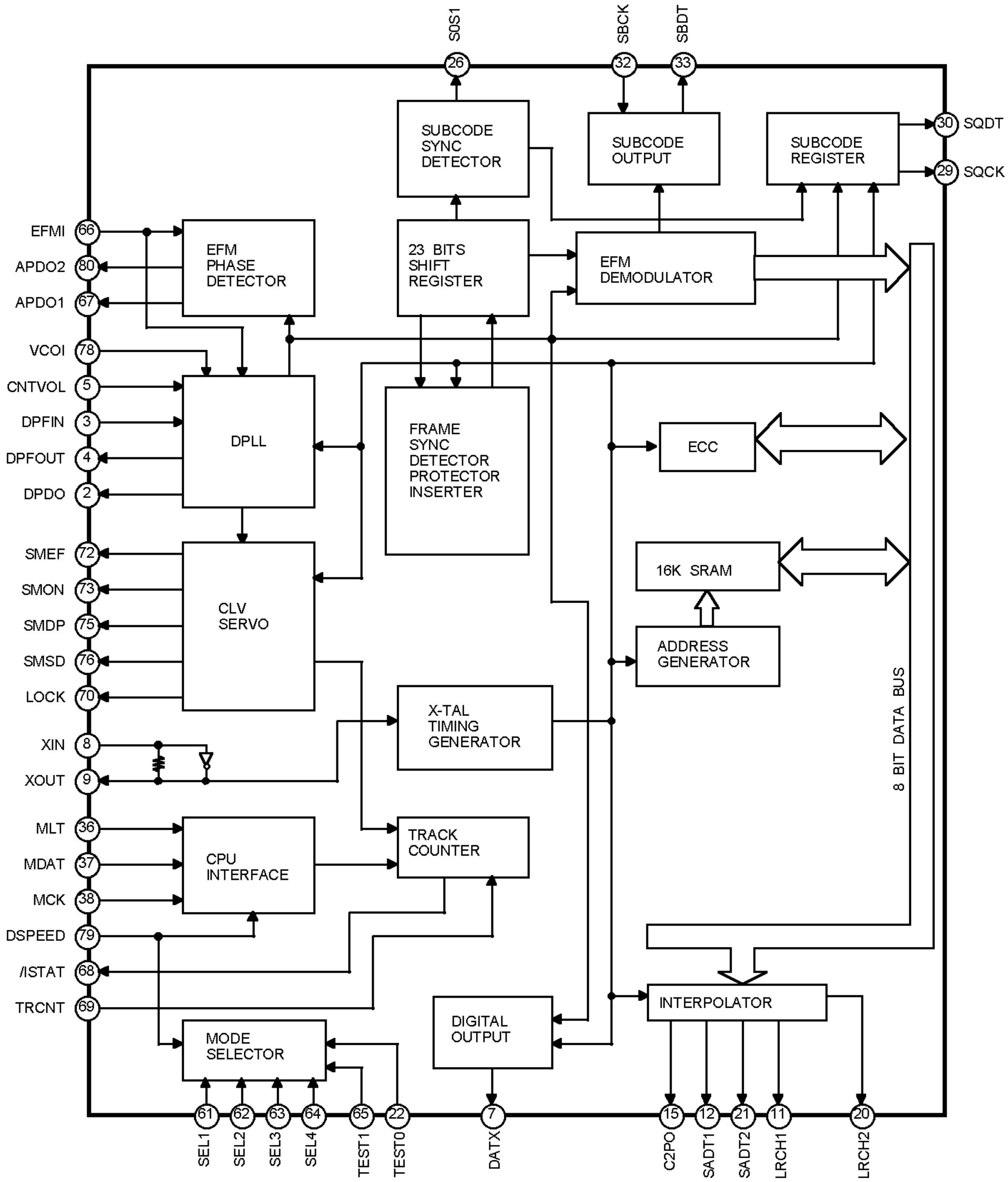


Fig. 1

PIN CONFIGURATION

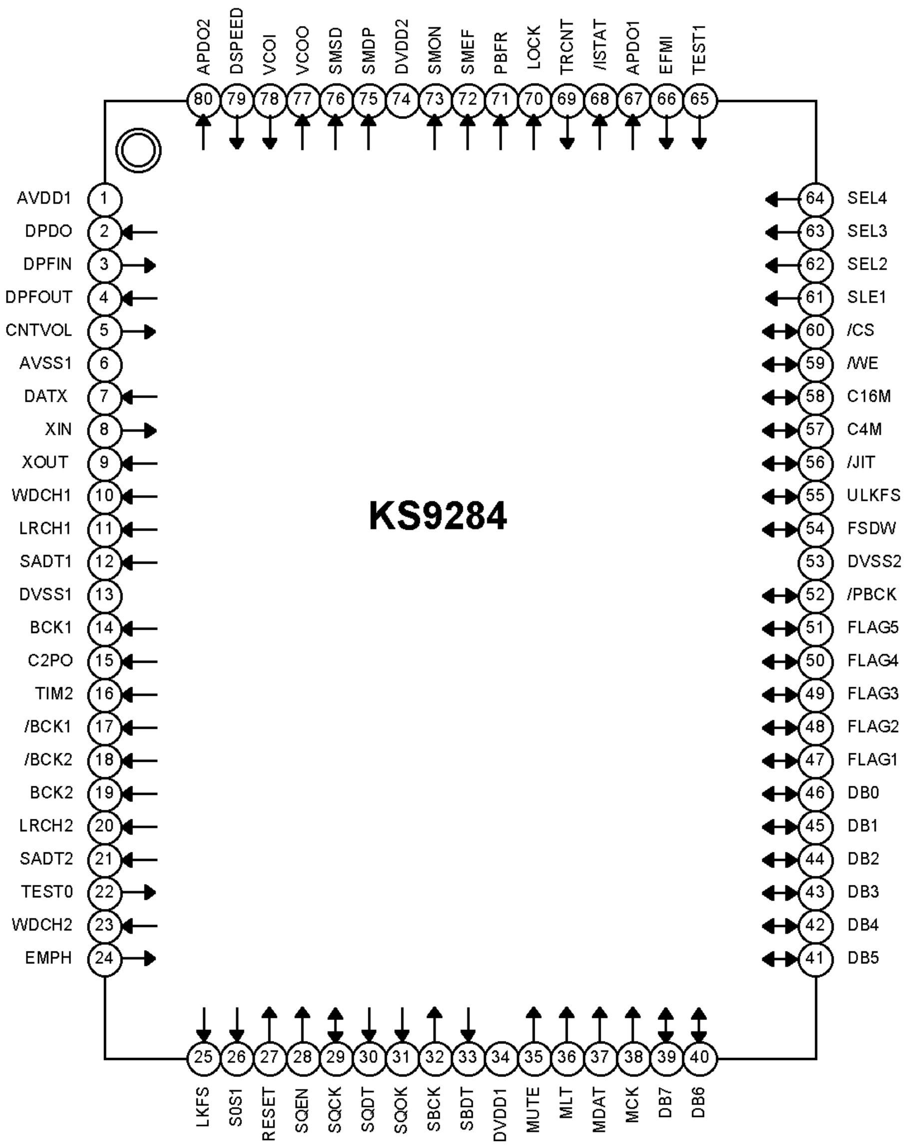


Fig. 2

PIN DESCRIPTION

Pin No.	Symbol	I/O	Description
1	$AV_{DD}1$	-	Analog supply voltage 1
2	DPDO	O	Charge pump output for master PLL
3	DPFIN	I	Filter input for master PLL
4	DPFOUT	O	Filter output for master PLL
5	CNTVOL	I	VCO control voltage for master PLL
6	$AV_{SS}1$	-	Analog ground 1
7	DATX	O	Digital audio output
8	XIN	I	X-tal oscillator input (16.9344MHz / 33.8688MHz)
9	XOUT	O	X-tal oscillator output
10	WDCH1	O	Word clock of 48 bits/slot
11	LRCH1	O	Channel clock of 48 bits/slot
12	SADT1	O	Serial audio data output with 48 bits/slot
13	DV_{SS1}	-	Digital ground 1
14	BCK1	O	Serial audio data bit clock for 48 bits/slot
15	C2PO	O	C2 pointer for serial audio data
16	TIM2	O	Normal or double speed control output pin
17	/BCK1	O	Inverted clock of BCK1
18	/BCK2	O	Inverted clock of BCK2
19	BCK2	O	Serial audio data bit clock for 64 bits/slot
20	LRCH2	O	Channel clock for 64 bits/slot
21	SADT2	O	Serial audio data output with 64 bits/slot
22	TEST0	I	Test input pin (“L”: normal, “H”: test)
23	WDCH2	O	Word clock of 64 bit/slot
24	EMPH	O	Emphasis/Non-emphasis output (“H” : Emphasis)
25	LKFS	O	The lock status output of frame sync
26	S0S1	O	Output of subcode sync signal (S0 + S1)
27	RESET	I	System reset at “L”
28	SQEN	I	SQCK control input (“L”: internal clock, “H”: external clock)
29	SQCK	I/O	Subcode-Q data bit clock
30	SQDT	O	Subcode-Q data serial output

PIN DESCRIPTION (continued)

Pin No.	Symbol	I/O	Description
31	SQOK	O	The CRC check result signal output of subcode-Q
32	SBCK	I	Subcode data bit clock
33	SBDT	O	Subcode serial data output
34	$DV_{DD}1$	-	Digital supply voltage 1
35	MUTE	I	Mute control input (“H”: Mute ON)
36	MLT	I	Latch signal input from micom
37	MDAT	I	Serial data input from micom
38	MCK	I	Serial data transfering clock input from micom
39	DB7	I/O	Data port 7 for external SRAM (MSB)
40	DB6	I/O	Data port 6 for external SRAM
41	DB5	I/O	Data port 5 for external SRAM
42	DB4	I/O	Data port 4 for external SRAM
43	DB3	I/O	Data port 3 for external SRAM
44	DB2	I/O	Data port 2 for external SRAM
45	DB1	I/O	Data port 1 for external SRAM
46	DB0	I/O	Data port 0 for external SRAM (LSB)
47	FLAG1	I/O	Monitoring output for C1 error correction (RA0)
48	FLAG2	I/O	Monitoring output for C1 error correction (RA1)
49	FLAG3	I/O	Monitoring output for C2 error correction (RA2)
50	FLAG4	I/O	Monitoring output for C2 error correction (RA3)
51	FLAG5	I/O	C2 decoder flag (“H”: when the processing C2 code is impossible correction status /RA4)
52	/PBCK	I/O	VCOI/2 clock (4.3218/8.6436MHz) ; when locked in with EFMI (RA5)
53	$DV_{SS}2$	-	Digital ground 2
54	FSDW	I/O	Unprotected frame sync (RA6)
55	ULKFS	I/O	Frame sync protection status (RA7)
56	/JIT	I/O	RAM overflow and underflow status (RA8)
57	C4M	I/O	4.2336MHz clock output (RA9)
58	C16M	I/O	16.9344MHz clock output (RA10)
59	/WE	I/O	Write enable output to external SRAM
60	/ CS	I/O	Chip select output to external SRAM

PIN DESCRIPTION (continued)

Pin No.	Symbol	I/O	Description
61	SEL1	I	X-tal selection terminal (“L”:16.9344MHz; “H” : 33.8688MHz)
62	SEL2	I	DPLL selection terminal (“L”: DPLL, “H” : APLL)
63	SEL3	I	CD-ROM selection terminal (“L”: CDP, “H” : CD-ROM)
64	SEL4	I	SRAM selection terminal (“L”: internal SRAM, “H” : external SRAM)
65	TEST1	I	Test terminal (“L”: normal, “H”: test)
66	EFMI	I	EFM data input
67	APDO1	O	Charge pump output for analog PLL
68	/ISTAT	O	The internal status output
69	TRCNT	I	Tracking clock input signal
70	LOCK	O	Output signal of LKFS conditions sampled PBFR/16 (If LKFS is “H”, lock is “H”. If the LKFS is sampled “L” at least 8 times by PBFR/16, lock is “L”)
71	PBFR	O	Write frame clock (Lock : 7.35KHz)
72	SMEF	O	LPF time constant control of the spindle servo error signal
73	SMON	O	ON/OFF control signal for spindle servo
74	$DV_{DD}2$	-	Digital supply vlotage 2
75	SMDP	O	Spindle motor driving output (rough control in the speed mode, phase control in the phase mode
76	SMSD	O	Spindle motor (Velocity control in the phase mode)
77	VCOO	O	VCO output
78	VCOI	I	VCO inut (when the state is lock by means of PBFR, it is 8.6436MHz)
79	DSPEED	I	Double speed mode control (“H”: normal speed, “L”: 2-times speed)
80	APDO2	O	Analog PLL charge pump output for double speed mode

(NOTE)
1. PBFR: 7.35KHz Write frame clock produced by data which being reproduced.
2. /PBCK : Channel bit clock of data which being reproduced.
3. /JIT : Display signal of either RAM overflow or underflow for $\pm$ 4 frame jitter margin.

KA8301

Bi-Directional DC Motor Driver

Features

- Built-in brake function.
- Built-in element to absorb a surge current derived from changing motor direction and braking motor drive.
- External motor speed control pin
- Motor direction change circuit.
- Interfaces with CMOS devices.

Description

The KA8301 is a monolithic integrated circuit designed for driving bi-directional DC motor with braking and speed control, and it is suitable for the loading motor driver of VCR systems. The speed control can be achieved by adjusting the external voltage of the speed control pin.

10-SIPH-B



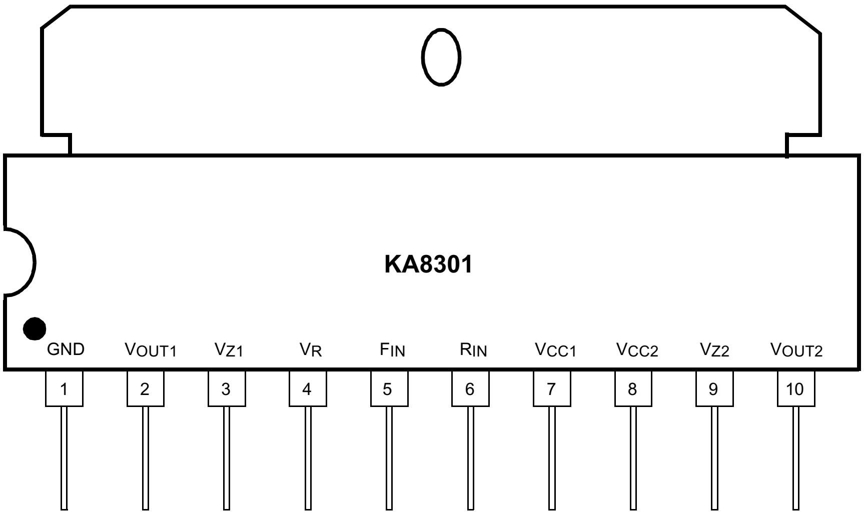
Typical Application

- Video cassette recorder (VCR) loading motor
- Low current DC motor such audio or video equipment
- General DC motor

Ordering Information

Device	Package	Operating Temp.
KA8301-L	10-SIPH-B	–25°C ~ +75°C

Pin Assignments



Pin Definitions

Pin Number	Pin Name	I/O	Pin Function Description
1	GND	-	Ground
2	V_{OUT1}	O	Output 1
3	V_{Z1}	-	Phase compensation
4	V_R	I	Motor speed control
5	F_{IN}	I	Input 1
6	R_{IN}	I	Input 2
7	V_{CC1}	-	Supply voltage (Signal)
8	V_{CC2}	I	Supply voltage (Power)
9	V_{Z2}	I	Phase compensation
10	V_{OUT2}	O	Output 2

BURR - BROWN®



PCM1702P
PCM1702U

BiCMOS Advanced Sign Magnitude 20-Bit DIGITAL-TO-ANALOG CONVERTER

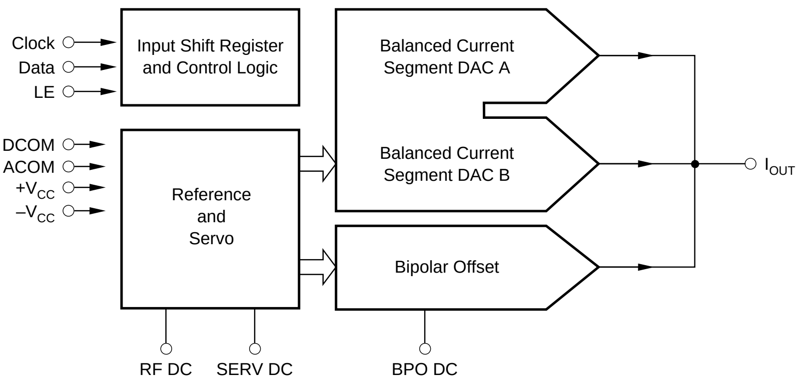
FEATURES

- **ULTRA LOW –96dB max THD+N (No External Adjustment Required)**
- **NEAR-IDEAL LOW LEVEL OPERATION**
- **GLITCH-FREE OUTPUT**
- **120dB SNR TYP (A-Weight Method)**
- **INDUSTRY STD SERIAL INPUT FORMAT**
- **FAST (200ns) CURRENT OUTPUT (±1.2mA)**
- **CAPABLE OF 16X OVERSAMPLING**
- **COMPLETE WITH REFERENCE**
- **LOW POWER (150mW typ)**

DESCRIPTION

The PCM1702 is a precision 20-bit digital-to-analog converter with ultra-low distortion (–96dB typ with a full scale output). Incorporated into the PCM1702 is an advanced sign magnitude architecture that eliminates unwanted glitches and other nonlinearities around bipolar zero. The PCM1702 also features a very low noise (120dB typ SNR: A-weighted method) and fast settling current output (200ns typ, 1.2mA step) which is capable of 16X oversampling rates.

Applications include very low distortion frequency synthesis and high-end consumer and professional digital audio applications.



International Airport Industrial Park • Mailing Address: PO Box 11400 • Tucson, AZ 85734 • Street Address: 6730 S. Tucson Blvd. • Tucson, AZ 85706
Tel: (520) 746-1111 • Twx: 910-952-1111 • Cable: BBRCORP • Telex: 066-6491 • FAX: (520) 889-1510 • Immediate Product Info: (800) 548-6132

PDS-1175B
Printed in U.S.A. June, 1995

SPECIFICATIONS

All specifications at 25°C, $\pm V_{CC}$ and $+V_{DD}$ = ±5V unless otherwise noted.

PARAMETER	CONDITIONS	PCM1702P/U, -J, -K MIN	TYP	MAX	UNITS
RESOLUTION		20			Bits
DYNAMIC RANGE, THD + N at –60dB Referred to Full Scale, with A-weight			110		dB
DIGITAL INPUT					
Logic Family			TTL/CMOS Compatible		
Logic Level: V_{IH}		+2.4		$+V_{DD}$	V
V_{IL}		0		0.8	V
I_{IH}	$V_{IH} = +V_{DD}$			±10	µA
I_{IL}	V_{IL} = 0V			±10	µA
Data Format			Serial, MSB First, BTC(1)		
Input Clock Frequency			12.5	20.0	MHz
TOTAL HARMONIC DISTORTION + N(2)					
P/U V_O = 0dB	f_S = 352.8kHz(3), f = 1002Hz(4)		–92	–88	dB
V_O = –20dB	f_S = 352.8kHz(3), f = 1002Hz(4)		–82	–74	dB
V_O = –60dB	f_S = 352.8kHz(3), f = 1002Hz(4)		–46	–40	dB
P/U, -J V_O = 0dB	f_S = 352.8kHz(3), f = 1002Hz(4)		–96	–92	dB
V_O = –20dB	f_S = 352.8kHz(3), f = 1002Hz(4)		–83	–76	dB
V_O = –60dB	f_S = 352.8kHz(3), f = 1002Hz(4)		–48	–42	dB
P/U, -K V_O = 0dB	f_S = 352.8kHz(3), f = 1002Hz(4)		–100	–96	dB
V_O = –20dB	f_S = 352.8kHz(3), f = 1002Hz(4)		–84	–80	dB
V_O = –60dB	f_S = 352.8kHz(3), f = 1002Hz(4)		–50	–44	dB
ACCURACY					
Level Linearity	At –90dB Signal Level		±0.5		dB
Gain Error			±0.5	±3	%
Bipolar Zero Error(5)			±0.25		%
Gain Drift	0°C to 70°C		±25		ppm of FSR/°C
Bipolar Zero Drift	0°C to 70°C		±5		ppm of FSR/°C
Warm-up Time			1		minute
IDLE CHANNEL SNR(6)	Bipolar Zero, A-weighted Filter	110	120		dB
ANALOG OUTPUT					
Output Range			±1.2		mA
Output Impedance			1.0		kΩ
Settling Time	(±0.003% of FSR, 1.2mA Step)		200		ns
Glitch Energy			No Glitch Around Zero		
POWER SUPPLY REQUIREMENTS					
Supply Voltage Range: $+V_{CC} = +V_{DD}$		+4.75	+5.00	+5.25	V
$-V_{CC} = -V_{DD}$		–4.75	–5.00	–5.25	V
Combined Supply Current: $+I_{CC}$	$+V_{CC} = +V_{DD}$ = +5V		+5.00	+9.0	mA
Combined Supply Current: $-I_{CC}$	$-V_{CC} = -V_{DD}$ = –5V		–25.00	–41.0	mA
Power Dissipation	$\pm V_{CC} = \pm V_{DD}$ = ±5V		150	250	mW
TEMPERATURE RANGE					
Operating		–25		+85	°C
Storage		–55		+125	°C

NOTES: (1) Binary Two's Complement coding. (2) Ratio of ($Distortion_{RMS}$ + $Noise_{RMS}$) / $Signal_{RMS}$. (3) D/A converter sample frequency (8 x 44.1kHz; 8x oversampling). (4) D/A converter output frequency (signal level). (5) Offset error at bipolar zero. (6) Measured using an OPA627 and 5kΩ feedback and an A-weighted filter.

ABSOLUTE MAXIMUM RATINGS (DIP Package)

Power Supply Voltage	±6.5VDC
Input Logic Voltage	DGND—0.3V~+V_{DD}+0.3V
Operating Temperature	–25°C to +85°C
Storage Temperature	–55°C to +125°C
Power Dissipation	500mW
Lead Temperature (soldering, 10s)	260°C

ABSOLUTE MAXIMUM RATINGS (SOP Package)

Power Supply Voltage	±6.5VDC
Input Logic Voltage	DGND—0.3V~+V_{DD}+0.3V
Operating Temperature	–25°C to +85°C
Storage Temperature	–55°C to +125°C
Power Dissipation	300mW
Lead Temperature (soldering, 5s)	260°C

PIN ASSIGNMENTS (DIP Package)

PIN	MNEMONIC	PIN	MNEMONIC
1	DATA	9	+V_{CC}
2	CLOCK	10	BPO DC
3	+V_{DD}	11	I_{OUT}
4	DCOM	12	ACOM
5	–V_{DD}	13	ACOM
6	LE	14	SERV DC
7	NC	15	REF DC
8	NC	16	–V_{CC}

PIN ASSIGNMENTS (SOP Package)

PIN	MNEMONIC	PIN	MNEMONIC
1	DATA	11	+V_{CC}
2	CLOCK	12	BPO DC
3	NC	13	NC
4	+V_{DD}	14	I_{OUT}
5	DCOM	15	ACOM
6	–V_{DD}	16	ACOM
7	LE	17	SERV DC
8	NC	18	NC
9	NC	19	RFE DC
10	NC	20	–V_{CC}

PACKAGE INFORMATION(1)

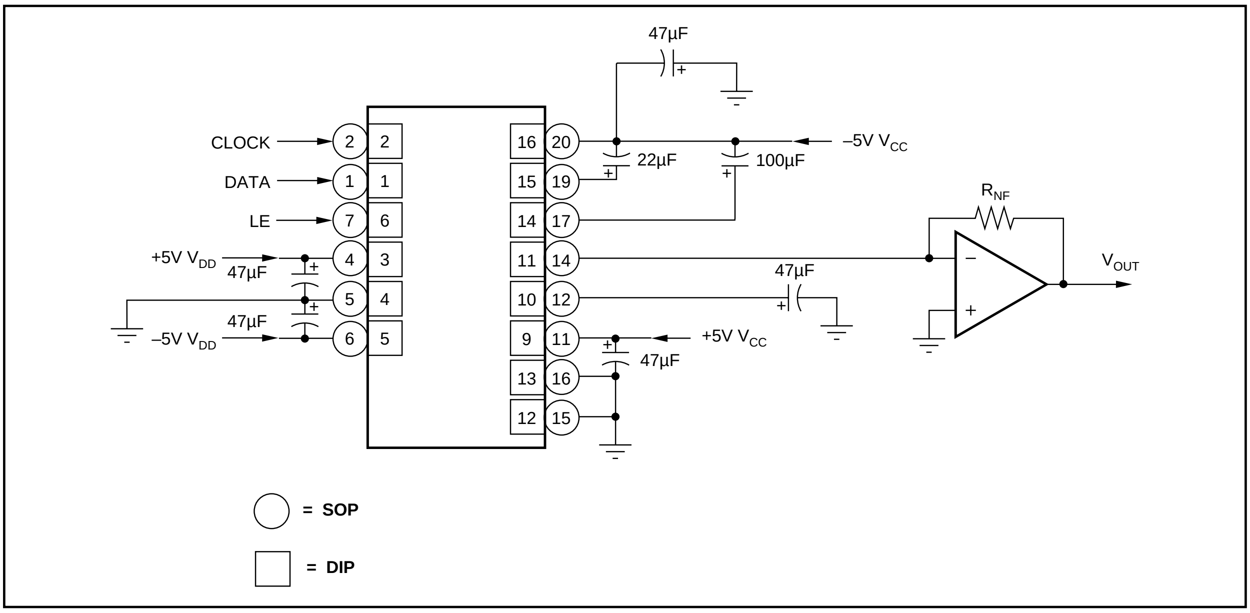
MODEL	PACKAGE	PACKAGE DRAWING NUMBER
PCM1702P	16-Pin Plastic DIP	180
PCM1702U	20-Pin Plastic SOP	248

NOTE: (1) For detailed drawing and dimension table, please see end of data sheet, or Appendix D of Burr-Brown IC Data Book.

GRADE MARKING (SOP Package)

MODEL	PACKAGE
PCM1702U	Marked PCM1702.
PCM1702U-J	Marked with white dot by pin 10.
PCM1702U-K	Marked with red dot by pin 10.

CONNECTION DIAGRAM



HDCD®

PMD-100

PMD-100 Process Decoder

General Description

The PMD-100 HDCD® Process Decoder is a sophisticated 0.6 micron CMOS Integrated Circuit that performs precise decoding of HDCD encoded recordings. The Decoder also functions as a state-of-the-art digital filter when fed data from non-HDCD recordings. It is designed to interface directly with popular data receivers and DAC's, eliminates the need for conventional monolithic digital filters. The PMD-100 has been carefully designed to maximize performance and ease of use in a wide variety of applications.

HDCD Process Information

Data encoded with HDCD process information carries precisely encrypted signals, hidden within the LSB of the 16-bit data word. Over time, only 1 to 5% of the LSB is used for this hidden code. The encoded information is inaudible and causes no perceptible loss of information. The PMD-100 recognizes the encrypted signals as HDCD process information, and directs the decoding function to precisely reconstruct the high resolution signal in a form appropriate for output to the D-A converter being used.

Note: *To preserve HDCD process information, no alteration of the encoded data is allowed prior to processing by the PMD-100. Digital data processing including phase inversion prior to the PMD-100 input will result in the loss of HDCD process information encoded in the data.*

SPECIAL FEATURES

Automatic HDCD Process Decoding

When the PMD-100 detects HDCD® process information in the input data, it automatically switches to HDCD® decode mode, and provides an output to drive an LED indicator. When non-HDCD® process input data is received, the decoder automatically operates as a high performance digital filter.

Excellent Filter Characteristics

When operating as a digital filter, the PMD-100 exhibits passband characteristics that have been carefully optimized to provide extremely accurate sound quality. Passband ripple from 0 to 20 kHz is within ±.0001 dB and stopband attenuation is greater than 120 dB.

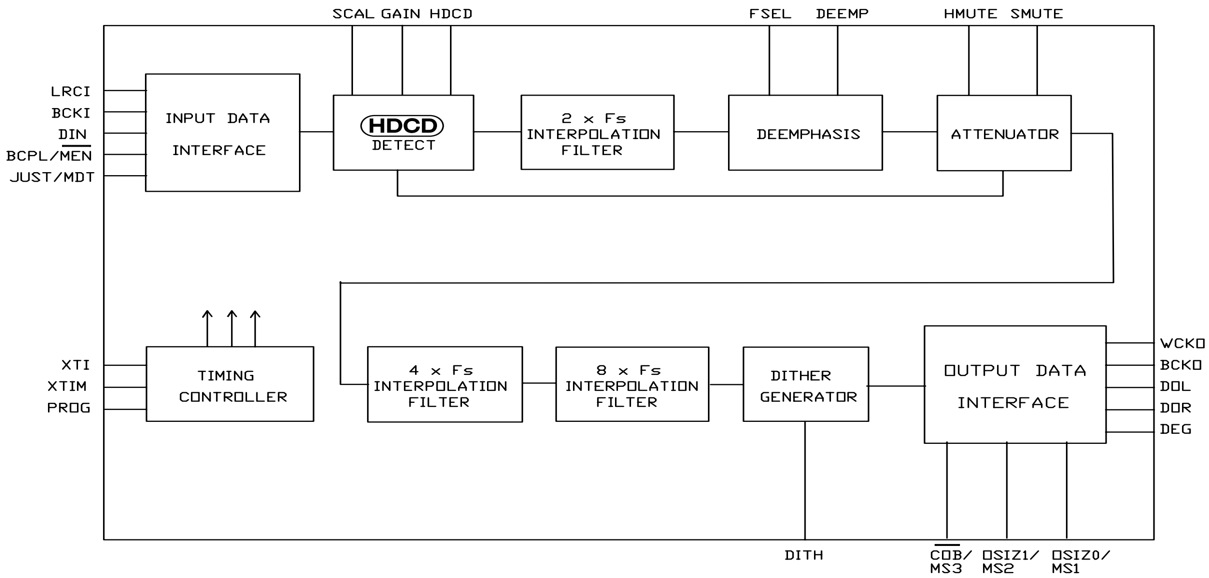
Two Operating Modes

Stand-Alone

In Stand-Alone Mode, the PMD-100 requires no external controller, allowing for the most cost effective designs.

Program

In Program mode, an external processor controls the PMD-100's many advanced operating modes and features.



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9300-0005
Rev A1

PMD-100

PMD-100 Process Decoder

HDCD®

SPECIAL FEATURES (Cont.)

DAC Optimize Operating Modes

To achieve the best possible performance from a variety of different DAC types, adjustable parameters are provided including eight different levels of dither and Patented "Silent Conversion" variable clock timing.

Constant Clock Output

The PMD-100 constantly provides output clocking to the DAC, even if input data and master clocks are lost. This feature eliminates the possiblility of spikes or DC offsets at the DAC's output.

Additional Features

- *24 bit or greater accuracy provided for all operations.*
- *Up to 24 bit input data passed without truncation.*
- *32 kHz to 55 kHz input data rates.*
- *Output digital attenuation over a 96 dB range in 0.188 dB steps.*
- *Output soft mute and hard mute functions.*
- *16, 18, 20 or 24 bit output data.*
- *8 Fs, 4 Fs or 2 Fs output data rates. (Multiple output data rates are provided to allow flexible DAC operation and ease of use in designs that employ custom DSP based filters for non-HDCD® process recordings.)*
- *Digital domain deemphasis.*
- *256 Fs or 384 Fs system clock.*

DC Specifications

Electrical

Digital Characterisitcs V_{DD} = 4.75V to 5.25V, V_{SS} = OV, T_A = 0°C to +70°C unless otherwise specified.

PARAMETER	PIN	SYMBOL	CONDITION	MIN	TYP	MAX	UNITS
INPUT							
Logic Family					CMOS		
Logic Voltage	XTI	V_{IL}				$0.3V_{DD}$	V
	XTI	V_{IH}		$0.7V_{DD}$			V
	OTHER INPUTS	V_{IL}				0.5	V
	OTHER INPUTS	V_{IH}		2.4			V
Input Leakage Curent	XTI	I_{LH}	$V_{IN} = V_{DD}$		10	20	µA
	XTI	I_{LL}	V_{IN} = OV		10	20	µA
	OTHER INPUTS	I_{LH}	$V_{IN} = V_{DD}$			1	µA
Input Current	OTHER INPUTS	I_{IL}	V_{IN} = OV		10	20	µA
OUPUT							
Logic Family					CMOS		
Logic Voltages	ALL OUTPUTS	V_{OL}	I_{OL} = 1.6mA			0.4	V
	ALL OUTPUTS	V_{OH}	I_{OH} = -0.4mA	2.5			V
Power Supply Requirements							
Supply Voltage		V_{DD}		4.75	5	5.25	V
Supply Current		I_{DD}	V_{DD} = 5V			110	mA
Power Dissipation		P_D	NOMINAL V_{DD}			550	mW

PMD-100

PMD-100 Process Decoder

Pin Description (Stand-Alone Mode) - Pin 9 Low

(I = Input, O = Output. All input levels TTL compatible except XTI which must be CMOS level. No inputs have pull-ups. All outputs are full CMOS levels.)

1: DIN (I) Serial data input.
2: BCKI (I) Bit clock input.
3: XTIM (I) Select system clock frequency. Low = 256 Fs, High = 384 Fs.
4: DITH (I) Dither select. Low = dither disabled, High = dither added.
5: GAIN (O) Analog output stage gain. Use only if Pin 19 is High (see page 14). Low = low gain, High = high gain (+6 dB). (See pin 19 description).
6: XTI (I) System clock input.
7: VDD1 +5 volt power for filter.
8: VSS1 Ground
9: PROG(I) Select Program mode. Low = Stand-Alone, High = Program.

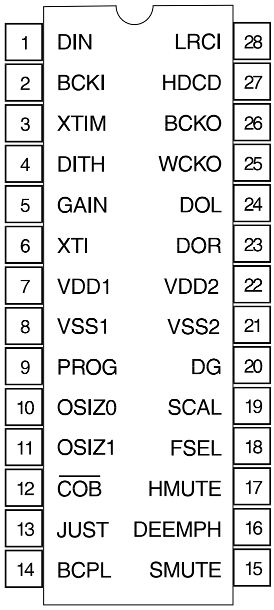
Note: Pins 10 through 14 perform different functions depending on whether Stand-Alone or Program mode is selected.

Stand-Alone Mode:

	16 Bits	18 Bits	20 Bits	24 Bits
10: OSIZ0 (I)	0	1	0	1
11: OSIZ1 (I)	0	0	1	1

These two pins determine the output word size, as well as the number of pulses on BCKO.

12: $\overline{\text{COB}}$ (I) Output data format. Low = complementary offset binary, High = 2's complement.
13: JUST (I) Input data justification. Low = data assumed to be left justi fied up to 24 bits in length, High = data right justified 16 bits.
14: BCPL (I) Input data latching. Low = input data latched on rising edge of BCKI. High = input data latched on falling edge of BCKI.
15: SMUTE (I) Soft mute. Low = off, High = on.
16: DEEMPH(I) De-emphasis filter. Low = off, High = on.
17: HMUTE (I) Hard mute. Low = off, High = on.
18: FSEL (I) De-emphasis filter Fs. Low = 44.1 kHz, High = 48 kHz.
19: SCAL (I) Gain scaling. Low = 6dB gain scaling is performed internally in the digital domain, High = analog output gain stage is set by pin 5 GAIN. (See page 14.)
20: DG (O) DAC sample and hold deglitch signal.
21: VSS2 Ground. (Common with VSS1)
22: VDD2 +5 volt power for output interface.
23: DOR (O) Right channel serial data output.
24: DOL (O) Left channel serial data output.
25: WCKO(O) Word clock output.
26: BCKO (O) Bit clock output.
27: HDCD (O) HDCD encoding detect. Low = no encoding. High = HDCD encoded input data. (Output current rated at 12mA.)
28: LRCI (I) Word clock input.



Pin Configuration Stand-Alone Mode

HD6433724E93F MICROPROCESSOR

Overview
The H8/300L Series is a single-chip microcomputer (MCU: microcomputer unit), built around the high-speed H8/300L CPU and equipped with peripheral system functions on chip.

The H8/3724 and H8/3754 Series are single-chip microcomputers in the H8/300L Series equipped with high-voltage pins. Their on-chip peripheral functions include a vacuum fluorescent display (VFD) controller/driver, timers, a 14-bit PWM (pulse width modulator), two serial communication interface channels, and an analog-to-digital converter. Together these functions make this chip ideally suited to use as a microcontroller in embedded systems requiring a VFD display.

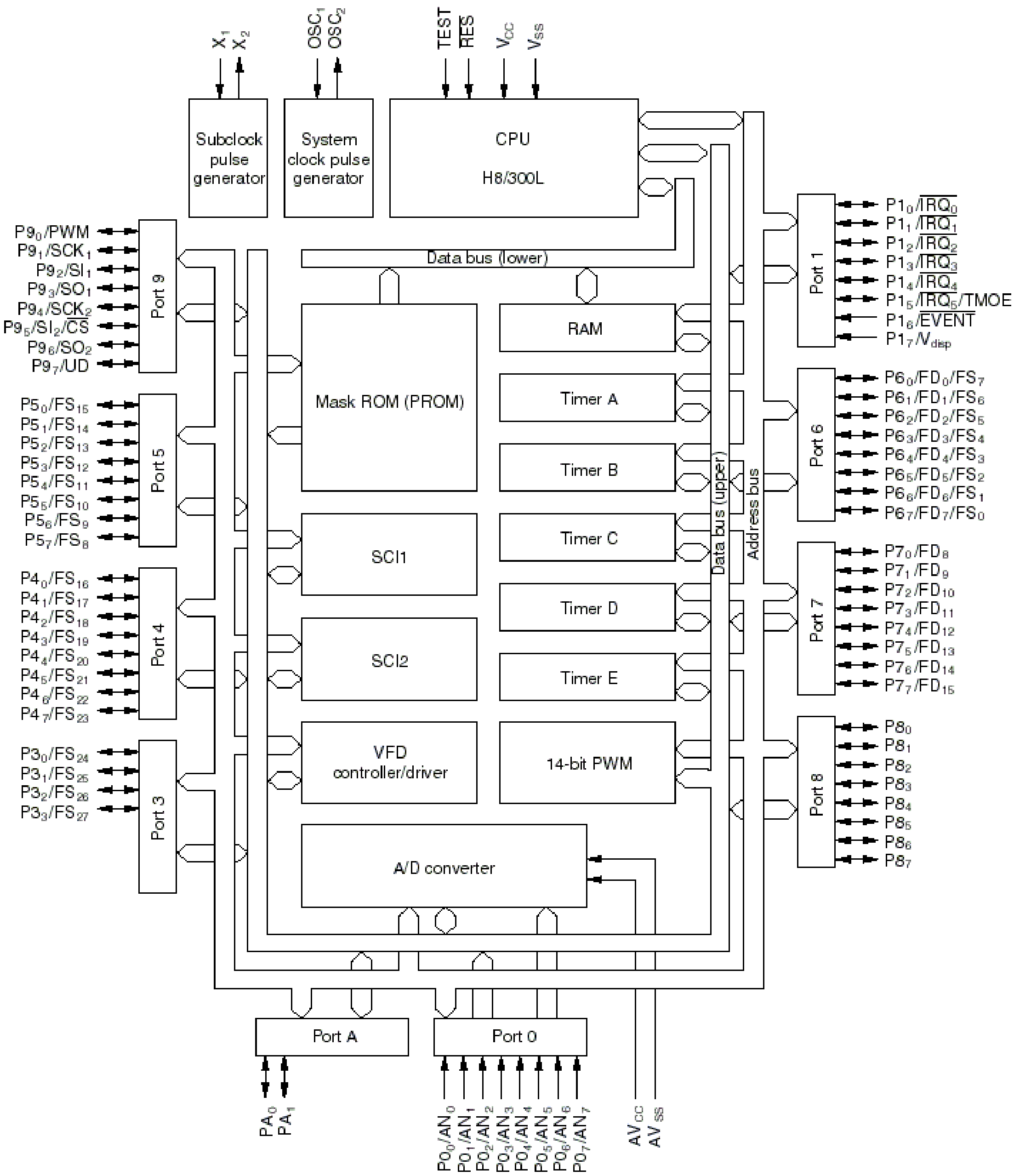
The H8/3724 and H8/3754 Series come in the following memory configurations for various system scale needs.

H8/3723: 24-kbyte ROM, 384-byte RAM
H8/3724: 32-kbyte ROM, 512-byte RAM
H8/3725: 40-kbyte ROM, 640-byte RAM
H8/3726: 48-kbyte ROM, 1,024-byte RAM
H8/3753: 24-kbyte ROM, 1,024-byte RAM
H8/3754: 32-kbyte ROM, 1,024-byte RAM

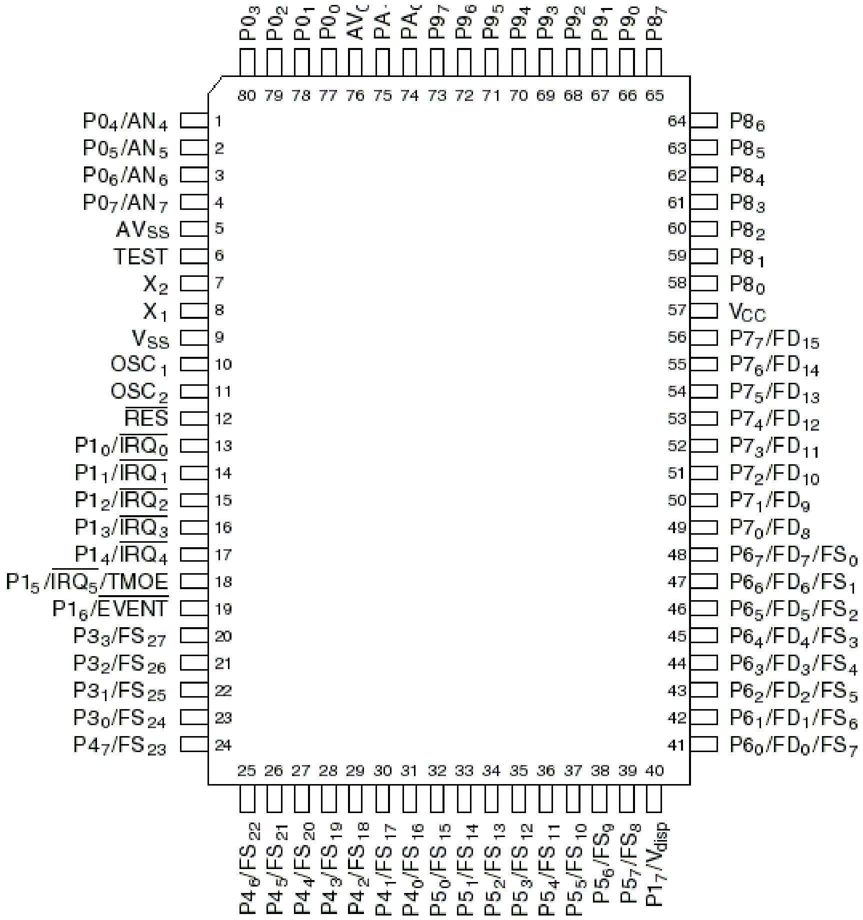
In addition to masked ROM versions available for the H8/3724 Series, H8/3724 and H8/3726 are also available in ZTATTM versions which allow the user to freely program the on-chip PROM.

Note: * ZTAT (zero turn around time) is a trademark of Hitachi, Ltd.

Internal Block Diagram



Pin Arrangement



REF. NO.	PART NO.	DESCRIPTION	QTY.

FL8550 MAIN BOARD

RESISTOR

REF. NO.	PART NO.	DESCRIPTION	QTY.
R32/33/35-37/52/59-63/79/80.	1001-001316-000	CARBON FILM RESISTOR 100 OHM 1/6W ±5%	13
R1/11/13/27/48/49/50.	1001-002316-000	CARBON FILM RESISTOR 1K OHM 1/6W ±5%	7
R20/21/26/42/110.	1001-003316-000	CARBON FILM RESISTOR 10K OHM 1/6W ±5%	5
R5/15/18/24/25.	1001-004316-000	CARBON FILM RESISTOR 100K OHM 1/6W ±5%	5
R7/64.	1001-005316-000	CARBON FILM RESISTOR 1M OHM 1/6W ±5%	2
R111.	1001-501312-000	CARBON FILM RESISTOR 150 OHM 1/2W ±5%	1
R14/22.	1001-504316-000	CARBON FILM RESISTOR 150K OHM 1/6W ±5%	2
R9/10.	1001-803316-000	CARBON FILM RESISTOR 18K OHM 1/6W ±5%	2
R6.	1001-804316-000	CARBON FILM RESISTOR 180K OHM 1/6W ±5%	1
J101.	1002-200312-000	CARBON FILM RESISTOR 22 OHM 1/2W ±5%	1
R2.	1002-200316-000	CARBON FILM RESISTOR 22 OHM 1/6W ±5%	1
R44.	1002-201316-000	CARBON FILM RESISTOR 220 OHM 1/6W ±5%	1
R34.	1002-202316-000	CARBON FILM RESISTOR 2.2K OHM 1/6W ±5%	1
R8/12.	1002-203316-000	CARBON FILM RESISTOR 22K OHM 1/6W ±5%	2
R38.	1002-701316-000	CARBON FILM RESISTOR 270 OHM 1/6W ±5%	1
R29/51/84.	1002-703316-000	CARBON FILM RESISTOR 27K OHM 1/6W ±5%	3
R30/31/39/40/41.	1003-302316-000	CARBON FILM RESISTOR 3.3K OHM 1/6W ±5%	5
R16/45/85.	1003-303316-000	CARBON FILM RESISTOR 33K OHM 1/6W ±5%	3
R3.	1004-700316-000	CARBON FILM RESISTOR 47 OHM 1/6W ±5%	1
R46.	1004-701316-000	CARBON FILM RESISTOR 470 OHM 1/6W ±5%	1
R53-57/109.	1004-702316-000	CARBON FILM RESISTOR 4.7K OHM 1/6W ±5%	6
R4.	1005-104316-000	CARBON FILM RESISTOR 510K OHM 1/6W ±5%	1
R23.	1005-602316-000	CARBON FILM RESISTOR 5.6K OHM 1/6W ±5%	1
R19.	1005-603316-000	CARBON FILM RESISTOR 56K OHM 1/6W ±5%	1
R58.	1006-801316-000	CARBON FILM RESISTOR 680 OHM 1/6W ±5%	1
R17.	1006-803316-000	CARBON FILM RESISTOR 68K OHM 1/6W ±5%	1
R83.	1008-200316-000	CARBON FILM RESISTOR 82 OHM 1/6W ±5%	1
R28.	1008-202316-000	CARBON FILM RESISTOR 8.2K OHM 1/6W ±5%	1
R47.	1009-100316-000	CARBON FILM RESISTOR 91 OHM 1/6W ±5%	1
R105-108.	1011-002014-000	METAL FILM RESISTOR 1K OHM 1/4W ±1%	4
R77/78.	1011-104016-000	METAL FILM RESISTOR 100K 1/6W ±1%	2
R71-76	1011-502016-000	METAL FILM RESISTOR 1.5K OHM 1/4W ±1%	6
R67/68	1011-802014-000	METAL FILM RESISTOR 1.8K OHM 1/4W ±1%	2
R69/70	1014-701014-000	METAL FILM RESISTOR 470K OHM 1/4W ±1%	2
R65/66	1015-102016-000	METAL FILM RESISTOR 5.1K OHM 1/6W ±1%	2
VR1	1051-003500-001	VARIABLE RESISTOR 10K OHM ±30%	1
VR2-4	1052-003600-110	VARIABLE RESISTOR 20K OHM ±30%	3

CAPACITOR

REF. NO.	PART NO.	DESCRIPTION	QTY.
C50/51	1100-100042-001	CERAMIC CAP. 10pF/50V ±5% NPO	2
C44/114/122	1100-102044-000	CERAMIC CAP. 1000pF/50V ±20%	3
C97/98/104-108/121/128	1100-103044-000	CREAMIC CAP. 0.01uF/50V ±20%	9
C38/45-47/49/77-80/85/86/91-94/99/111	1100-104044-000	CERAMIC CAP. 0.1uF/50V ±20%	17
C67/68	1100-221043-000	CERAMIC CAP. 220pF/50V ±10%	2
C31	1101-102063-000	POLYESTER/MYLAR CAP. 0.001uF/100V ±10%	1
C6/12/18/27/32	1101-103063-000	POLYESTER/MYLAR CAP. 0.01uF/100V ±10%	5
C8/9/16/19/20/24/26	1101-104063-000	POLYESTER/MYLAR CAP. 0.1uF/100V ±10%	7
C37	1101-152063-000	POLYESTER/MYLAR CAP. 0.0015uF/100V ±10%	1
	1101-222062-000	POLYESTER/ MYLAR CAP. 2200pF/100V ±5%	6
C3/4/23/34/35	1101-223063-000	POLYESTER/MYLAR CAP. 0.022uF/100V ±10%	5
C5	1101-332063-000	POLYESTER/MYLAR CAP. 3300pF/100V ±10%	1
C7/13/29	1101-333063-000	POLYESTER/MYLAR CAP.0.033uF/100V ±10%	3
C21/25/36	1101-473063-000	POLYESTER/MYLAR CAP. 0.047uF/100V ±10%	3
C22	1101-682063-000	POLYESTER/MYLAR CAP. 0.0068uF/100V ±10%	1
C1/2/30/33/102/103	1102-101014-000	ELECT. CAP. 100uF/16V ±20%	6
C61-66	1102-101024-000	ELECT. CAP. 100uF/25V ±20%	6
C17	1102-220014-000	ELECT. CAP. 22uF/16V ±20%	1

C39/-39/42/75/76/100	1102-221014-000	ELECT. CAP. 220uF/16V ±20%	6
C95/96/101	1102-222014-000	ELECT. CAP. 2200uF/16V ±20%	3
C53-60	1102-337024-000	ELECT. CAP. 3.3uF/25V ±20%	8
C11/28/43	1102-470014-000	ELECT. CAP. 47uF/16V ±20%	3
C41/48/87-90	1102-471014-000	ELECT. CAP. 470uF/16V ±20%	6
C10	1102-477044-000	ELECT. CAP. 4.7uF/50V ±20%	1
C14/15	1102-478044-000	ELECT. CAP. 0.47UF/50V ±20%	2

TRANSISTOR

Q4/6/7	1300-805000-100	TRANSISTOR NPN 8050D TO92 (SAMSUNG)	3
Q5	1300-945000-100	TRANSISTOR NPN KSC945-Y (SAMSUNG)	1
Q1	1301-733000-100	TRANSISTOR PNP A733	1
Q2	1301-928000-100	TRANSISTOR PNP KS928A TO-92 (SAMSUNG)	1

DIODE

D1-5/7-10	1401-140020-000	DIODE RECTIFIER 1N4002	9
D6/11	1401-141480-000	DIODE 1N4148	2
ZD3	1402-510001-200	ZENER DIODE 5.1V 1/2W	1
ZD2	1402-560000-000	ZENER DIODE 5.6V 1/2W	1
ZD1	1402-620001-200	ZENER DIODE 6.2V1/2W	1

MISCELLANEOUS

J20	1503-353400-100	FERRITE COILS B3534	1
XTAL	1600-169343-000	CRYSTAL 16.9344 ± 30PPM 49U3H TYPE	1
CN19	2300-002000-001	STRAIGHT CONN. WAFER 2PINS 2mmP JST	1
CN20	2300-003000-001	STRAIGHT CONN. WAFER 3PINS 2mmP JST	1
CN1	2300-005000-000	STRAIGHT CONN. WAFER 5PINS 2mmP	1
CN3/5/6/17/18	2300-006000-001	STRAIGHT CONN. WAFER 6PINS 2mmP JST	5
CN2	2300-008000-000	STRAIGHT CONN. WAFER 8PINS 2mmP	1
CN11	2300-010000-000	STRAIGHT CONN. WAFER 10PINS 2mmP	1
CN10	2300-012000-000	STRAIGHT CONN. WAFER 12PINS 2mmP	1
CN4/14	2500-023001-040	2PINS 300MM 1CONN.(JST) CABLE AWG#26 2mmP	2
CN21 TO CN502	2500-037001-050	3PINS 700MM 1CONN. CABLE AWG#28 2mmP	1
CN3	2501-062801-150	6PINS 280MM 2CONN. RIBBON CABLE AWG#28 2mmP	1
CN2	2501-084001-150	8PINS 400MM 2CONN. CABLE AWG#28 2mmP	1
CN5 TO CN17	2506-062201-150	6PINS 220MM 2CONN. RIBBON CABLE AWG#28 2mmP	1
CN13 TO CN713	2510-024501-050	2PINS 450MM 1CONN. SHIELD CABLE AWG#28 2mmP	1
CN15 TO CN712	2510-044501-050	4PINS 450MM 1CONN. SHIELD CABLE AWG#28 2mmP	1
CN16	2510-047001-050	4PINS 700MM 1CONN. SHIELD CABLE AWG#28 2mmP	1
CN1	2510-052501-060	5PINS 250MM 1 CONN. SHIELD CABLE AWG#30 2mmP	1
	2600-100654-200	65MM JUMPER WIRE AWG#26 UL1007 RED	1
	2600-102004-000	200MM JUMPER WIRE AWG#26 UL1007 BLACK	1
	4002-311975-000	TOROID COILS “T31X19X7.5MM”	2
F101	4030-100000-000	MICRO FUSE 1A	1
RLY 1/2	4050-520000-000	RELAY DS2Y-SDC5V (NATIONAL)	2

INTEGRATED CIRCUIT

U9	4100-100056-200	I.C. PMD100 HDCD DIP (PACIFIC MICROSONICS) HDCD DECODER	1
U10/11	4117-020104-600	I.C. PCM1702U SOP (BURR-BROWN) DAC	2
U12-15	4155-320052-100	I.C. NE5532N 8P DIP (PHILIPS) OP-AMP	4
U8	4174-040012-100	I.C. 74HC04 DIP (PHILIPS) CMOS	1
U7	4174-740052-100	I.C. 74HC74 DIP (PHILIPS) CMOS	1
U16	4178-050304-100	I.C. 7805 3PINS TO-220 (JRC) REGULATOR	1
U19	4178-050310-000	I.C. LM78L05 TO92 REGULATOR	1
U6	4178-080301-400	I.C. MC7808AC 3PINS TO-220 (MOTOROLA) REGULATOR	1
U17	4178-080310-000	I.C. 78L08 TO92 (MIRCO) REGULATOR	1
U20	4179-050310-000	I.C. LM79L05 TO92 REGULATOR	1
U18	4179-080311-600	I.C. 79L08 TO92 (NJRC) OP-AMP	1
U4/5	4183-010020-400	I.C. KA8301 10PINS SIL MOTOR DRIVER	2
U1	4192-200122-400	I.C. KA9220C QFP SAMSUNG SSP	1
U2	4192-580122-400	I.C. KA9258D SMT SAMSUNG MOTOR DRIVE	1
U3	4192-840122-400	I.C. KS9284 QFP SAMSUNG DSP	1

RESISTOR

R511-514	1001-003316-000	CARBON FILM RESISTOR 10K OHM 1/6W +-5%	4
R507-510	1001-004316-000	CARBON FILM RESISTOR 100K OHM 1/6W +-5%	4
R503/504	1001-503316-000	CARBON FILM RESISTOR 15K OHM 1/6W +-5%	2
R501/502	1004-701316-000	CARBON FILM RESISTOR 470 OHM 1/6W +-5%	2
R515/516	1005-600314-000	CARBON FILM RESISTOR 56 OHM 1/6W +-5%	2
R505	1065-003500-130	VAR. RESISTOR 50K 1/4W +-20% ROTARY B-TYPE	1

CAPACITOR

C509/510	1100-102044-000	CERAMIC CAP. 1000pF/50V +-20%	2
C511	1100-103044-000	CERAMIC CAP. 0.01uF/50V +-20%	1
C503/504/511	1100-104044-000	CERAMIC CAP. 0.1uF/50V +-20%	3
C505-508	1102-100044-000	ELECT. CAP. 10uF/50V +-20%	4
C501/502	1102-101044-000	ELECT. CAP. 100uF/50V +-20%	2

MISCELLANEOUS

CN501-502	2300-003000-001	STRAIGHT CONN. WAFER 3PINS 2mmP JST	2
U502	2320-009911-003	6.4MM HEADPHONE JACK (JY-6303-02-030) GD PLT	1
	2605-100902-000	90MM GND WIRE 1RING (M3) AWG#22 BLK	1

INTEGRATED CIRCUIT

U501	4145-580051-600	I.C. NJM 4558L (NJRC) OP-AMP	1

FL8350/8550 CONTROL BOARD

RESISTOR

R831-832	1001-201316-000	CARBON FILM RESISTOR 120 OHM 1/6W +-5%	2
R833	1001-801316-000	CARBON FILM RESISTOR 180 OHM 1/6W +-5%	2
R834	1001-201316-000	CARBON FILM RESISTOR 120 OHM 1/6W +-5%	1
R835	1002-201316-000	CARBON FILM RESISTOR 330 OHM 1/6W +-5%	1

MISCELLANEOUS

S831-835	2400-020200-000	TACT SW 2P2T KPT-1105A (5MM)	5
CN831	2500-022001-040	2PIN 200MM 1 CONN CABLE AWG#26 2MMP	1

FL8350/8550 POWER BOARD

	2610-221000-000	2100MM POWER CORD W/POLARZED PLUG UL SPT-2 AWG#18	1
	3200-480140-401	TRANSFORMER EI48 118V CUL #4801Y44T-1 (WINBOND)	1
	4002-311975-000	TOROID COILS “T31X19X7.5MM”	1

FL8350/8550 POWER CONTROL BOARD

RESISTOR

R841	1001-501316-000	CARBON FILM RESISTOR 150 OHM 1/6W ±5%	1

MISCELLANEOUS

S841	2400-020200-003	PUSH SWITCH 2P2T ESB64801 (MATSUSHITA)	1
CN841	2500-032201-050	3PIN 220MM 1CONN CABLE AWG#28 UL1571	1
D841	3100-204000-001	LED 5MM BI-COLOR A/G #BL-BAG204	1

FL8550 MCU BOARD

RESISTOR

R701	1001-000320-000	CARBON FILM RESISTOR 10 OHM 2W ±5%	1
R704-705	1001-001314-000	CARBON FILM RESISTOR 100 OHM 1/4W ±5%	2
R703/722-725	1001-002316-000	CARBON FILM RESISTOR 1K OHM 1/6W ±5%	5
R731	1001-004316-000	CARBON FILM RESISTOR 100K OHM 1/6W ±5%	1

R708	1001-005316-000	CARBON FILM RESISTOR 1M OHM 1/6W ±5%	1
R706	1002-203316-000	CARBON FILM RESISTOR 22K OHM 1/6W ±5%	1
R730	1002-403316-000	CARBON FILM RESISTOR 24K OHM 1/6W ±5%	1
R702	1008-202316-000	CARBON FILM RESISTOR 8.2K OHM 1/6W ±5%	1
R733	1041-003318-331	RESISTOR ARRAY 10K x 4 1/8W TYPE A	1

CAPACITOR

C701	1100-102044-000	CERAMIC CAP. 0.01UF/50V ±20%	1
C703	1100-103044-000	CERAMIC CAP. 0.1UF/50V ±20%	1
C710/711	1100-104044-000	CERAMIC CAP. 22PF ±5% 'NPO'	2
C707	1102-100004-000	ELECT. CAP. 10UF/10V ±20%	1
C705	1102-100044-000	ELECT. CAP. 10UF/50V ±20%	1
C706	1102-101014-000	ELECT. CAP. 100UF/16V ±20%	1
C704	1102-221034-000	ELECT. CAP. 220UF/35V ±20%	1
C702	1102-330014-000	ELECT. CAP. 33uF/16V ±20%	1

TRANSISTORS

Q702	1300-100300-100	TRANSISTOR NPN KSR1003 (SAMSUNG)	1
Q701	1300-805000-100	TRANSISTOR NPN 8050D TO92 (SAMSUNG)	1

DIODES

D701-704	1401-140020-000	DIODE RECTIFIER 1N4002	4
D706/707	1401-141480-000	DIODE 1N4148	2
Z701	1402-240001-200	ZENER DIODE DZ24V 1/2W	1
Z702	1402-620001-200	ZENER DIODE 6V2 1/2W	1

MISCELLANEOUS

X701	1602-800002-000	REASONATOR 8.0MHZ	1
CN701	2300-002000-001	STARIGHT CONN WAFER 2PIN 2MMP JST	1
CN710	2300-003000-001	STARIGHT CONN WAFER 3PIN 2MMP JST	1
CN704	2300-004000-000	STARIGHT CONN WAFER 4PIN 2MMP	1
CN707	2300-007000-000	STARIGHT CONN WAFER 7PIN 2MMP	1
CN705	2300-010000-000	STARIGHT CONN WAFER 10PIN 2MMP	1
CN706	2300-012000-000	STARIGHT CONN WAFER 12PIN 2MMP	1
CN709	2370-014100-000	STARIGHT HEADER 14PIN 2.54MMP	1
CN711	2370-020100-000	STARIGHT HEADER 20PIN 2.54MMP	1
CN705	2501-103001-151	10PIN 300MM 2CONN CABLE AWG#28 UL1751 2MMP (GRAY)	1
CN706	2501-123001-151	12PIN 300MM 2CONN CABLE AWG#28 2MMP (GRAY)	1

INTEGRATED CIRCUITS

U701	4201-835000-601	I.C. 5 DISC VFD MCU 5FL15 HD6433724E93F	1

FL8350/8550 VFD BOARD

RESISTORS

R811	1001-201316-000	CARBON FILM RESISTOR 120 OHM 1/6W ±5%	1
R805/817	1001-801316-000	CARBON FILM RESISTOR 1K8 OHM 1/6W ±5%	2
R813	1002-201316-000	CARBON FILM RESISTOR 220 OHM 1/6W ±5%	1
R812	1003-001316-000	CARBON FILM RESISTOR 300 OHM 1/6W ±5%	1
R802/814	1003-305316-000	CARBON FILM RESISTOR 330 OHM 1/6W ±5%	2
R803/815	1005-601316-000	CARBON FILM RESISTOR 560 OHM 1/6W ±5%	2
R806/818	1005-602316-000	CARBON FILM RESISTOR 5K6 OHM 1/6W ±5%	2
R801	1006-201316-000	CARBON FILM RESISTOR 620 OHM 1/6W ±5%	1
R804/816	1009-101316-000	CARBON FILM RESISTOR 910 OHM 1/6W ±5%	

CAPACITORS

C801	1102-221014-000	ELECT. CAP. 220UF/16V ±20%	1

MISCELLANEOUS

CN805	2300-002000-001	STARIGHT CONN WAFER 2PIN 2MMP JST	1
CN804	2300-002000-001	STARIGHT CONN WAFER 3PIN 2MMP JST	1
CN801	2300-014110-000	RIGHT ANGLE HEADER 14PIN 2.54MMP	1
CN802	2300-020110-000	RIGHT ANGLE HEADER 20PIN 2.54MMP	1

S801-806/811-809	2400-020200-000	TACT SW 2P2T KPT-1105A (5MM)	15
CN803	2500-072601-040	7PIN 260MM 1CONN CABLE AWG#26 2MMP	1
	2507-145002-240	D-ROW CABLE 14PIN 500MM 2.54MMP	1
	2507-205002-240	D-ROW CABLE 20PIN 500MM 2.54MMP	1
U801	3001-260430-001	INFRARED SENSOR PIC-26043TM	1
VFD1	3106-081100-000	VFD DISPLAY SVA-08MM11	1

FL8350/8550 DIGITAL OUTPUT BOARD

RESISTORS

R751	1001-201316-000	CARBON FILM RESISTOR 100 OHM 1/6W ±5%	1
R753	1002-701316-000	CARBON FILM RESISTOR 270 OHM 1/6W ±5%	1
R750	1003-902316-000	CARBON FILM RESISTOR 3K9 OHM 1/6W ±5%	1
R754/755	1004-700316-000	CARBON FILM RESISTOR 47 OHM 1/6W ±5%	1
R752	1004-703316-000	CARBON FILM RESISTOR 470 OHM 1/6W ±5%	1

TRANSISTORS

Q750	1301-200300-100	TRANSISTOR PNP KSR2003 (SAMSUNG)	1

MISCELLANEOUS

CN753	2300-002000-001	STARIGHT CONN WAFER 2PIN 2MMP JST	1
CN752	2300-003000-001	STARIGHT CONN WAFER 3PIN 2MMP JST	1
U751	2320-004911-002	3.5MM EARPHONE JACK (JY3552-31-230) MONO	1
U753	2330-002901-000	RCA JACK RJ-1081-020-000	1
U752	2330-003911-003	RCA JACK AV-2-8.4-9	1
CN752 to CN803	2500-031501-050	3PIN 150MM 1CONN CABLE AWG#28 UL1571 2MMP	1
	2605-100502-000	50MM GND WIRE 1RING (M3) AWG#33 BLK	1

INTEGRATED CIRCUITS

U750	4181-700010-000	I.C. LTV817B LITION LINE COUPLER	1

FL8350/8550 SENSOR BOARD

RESISTORS

R2	1004-701316-000	CARBON FILM RESISTOR 470 OHM 1/6W ±5%	1
R1	1007-501316-000	CARBON FILM RESISTOR 750 OHM 1/6W ±5%	1

MISCELLANEOUS

CN1	2300-002010-000	RIGHT ANGLE CONN WAFER 2PIN 2MMP	1
CN2	2300-006010-000	HORIZONTAL CONN WAFER 6PIN 2MMP	1
	2500-021201-050	2PIN 120MM 1CONN CABLE AWG#26 2MMP	1
	2506-062501-150	6PIN 250MM 2CONN RIBBON CABLE AWG#28 2MMP	1
D2	3001-820000-000	INRARED SENSOR ST-8LR2 OPTO-SENSOR	1
D1	3004-206000-000	PHOTO COUPLER SG206 OPTO-SENSOR	1
D3	3100-800000-000	EMITTING DIODE EL-8L OPTO-SENSOR	1

FL8350/8550 SWITCH BOARD

RESISTORS

R2	1004-701316-000	CARBON FILM RESISTOR 470 OHM 1/6W ±5%	1
R1	1007-501316-000	CARBON FILM RESISTOR 750 OHM 1/6W ±5%	1

FL8350/8550 SWITCH BOARD

MISCELLANEOUS

J1	2300-003000-001	STRAIGHT CONN WAFER 3PIN 2MMP JST	1

FL8350/8550 LOADER BOARD

MISCELLANEOUS

J1	2300-003000-001	STRAIGHT CONN WAFER 3PIN 2MMP JST	1
	2300-006010-000	HORIZONTAL CONN. WAFER 6PINS 2MMP	1
	2411-010120-012	PU91 E04 LEAF SWITCH – SANYO 1EA4S13A00800	1
	3002-000000-000	SANYO OPTICAL PICK UP	1

OPTICAL PICK-UP

	4891-000060-002	PCB, SPINDLE MOTOR CD-PCB-06UL REV B	1
	6091-050001-000	PU91 IDLER GEAR A (DIA. 25X10MM)	1
	6091-050002-001	PU91 IDLER GEAR B (DIA. 23.3X10.5MM)	1
	6091-050003-000	PU91 MOTOR GEAR (DIA. 6X6.7MM)	1
	6091-050004-000	PU91 FEEDING GEAR (43X12)	1
	6091-050005-001	PU91 TURNTABLE ASS'Y	1
	6600-020006-000	PU91L02 GUIDE PIN B (DIA. 3X80MM)	1
	6600-020007-000	PU91L01 GUIDE PIN A (DIA. 3X68MM)	1
	7002-003010-022	SCREW M2X3 P/H	5
	7002-005010-042	SCREW M2X5 NO.1 FLAT (1/K(COUNTER HEAD)	2
	7002-606004-032	SCREW M2.6X6 1/P C.T.P	4
	9101-633700-000	SOLDER WIRE 63/67	0
	9113-000000-000	SCREW GLUE SL-118, RED	0
	9115-000020-000	GREASE DIAMOND #2	0
	9115-000501-000	SILICON GREASE SHINETSE #G501	0
	9291-050000-010	PU91 BASE ASSY	1
	6591-050001-003	PU91T BASE	1
	6600-020008-001	PU91L03a IDLER GEAR SHAFT	2
ALT PART 4A0200	RF-310T-11400-04917A	MOTOR RF-310T-11400 (19.7)	1
ALT PART 4A210	RF-310T-11400-04918A	MOTOR RF-310T-11400 (10.9)	1
	9115-000501-000	SILICON GREASE SHINETSE #G501	

FL8350/8550 TURN TABLE

	2300-006000-000	STRAIGHT CONN. WAFER 6PINS 2MMP	1
	2501-062801-150	6PIN 280MM 2CONN RIBBON CABLE AWG#28 2MMP	1

FL8550 FCC ADD-ON

J7, C366/CN2	1100-103044-000	CERAMIC CAP. 0.01UF/50V ±20%	4
C334(+), CN318(GND)/C326, C359(GND)	1100-104044-000	CERAMIC CAP. 0.1UF/50V ±20%	2
CN313. CN314	1053-161280-100	FERRITE COIL T16128 SIZE: 16X12X8	1
CN752/753	4002-311975-000	TOROID COILS "T31X19X7.5MM"	2

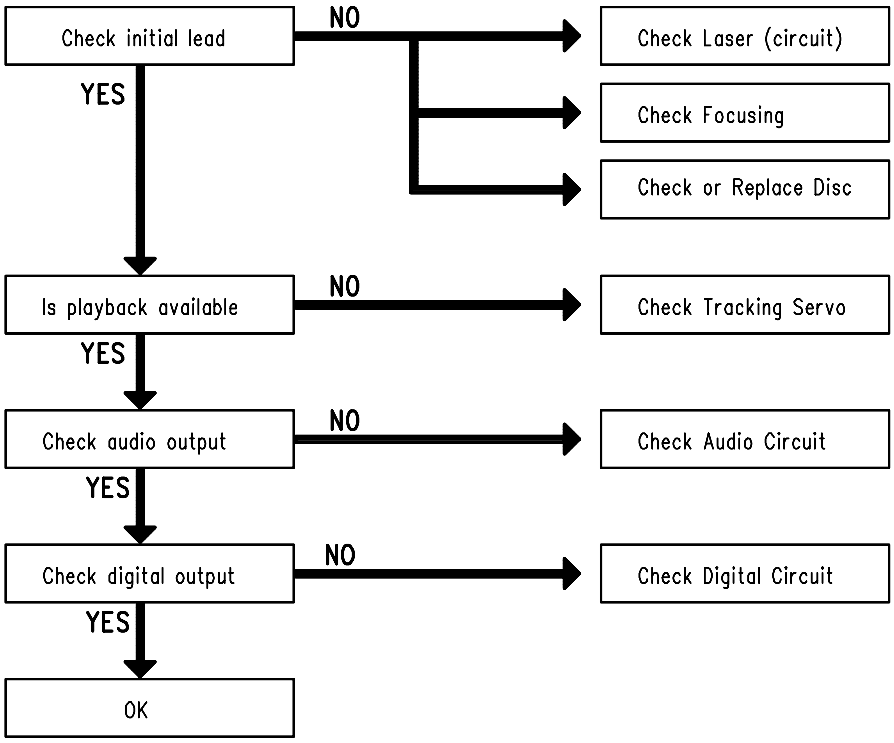
MECHANICAL PART LIST

Item	Part Number	Description	Qty
	9685-501000-003	**FL8550 MECHAN ASSY 120V NTRL/C LOW THD REV C**	
1	5110-362000-000	LASER PICK UP LABEL	1.0
2	6029-010012-000-01	PLASTIC FOOT (HOT STAMPING)	4.0
3	6083-510001-002-02	HARMAN/KARONT FRONT PANEL W/SILKCREEN&P	1.0
4	6083-510002-000-01	HARMAN/KARDON FL8350&FL8550 TRAY DOOR(WSILKSCREEN)	1.0
5	6083-510003-000-01	HARMAN/KARDON FL8550 DISPLAY LENS (W SILKSCREEN)	1.0
6	6083-510004-000-01	KNOB, DISC PAINTED	1.0
7	6083-510005-000-01	KNOB, PROGRAM PAINTED	1.0
8	6083-510006-000-01	KNOB VR PAINTED	1.0
9	6083-510007-000-01	KNOB, POWER PAINTED	1.0
10	6083-510008-000	*LENS, POWER KNOB	1.0
11	6083-510009-000-01	HARMAN/KARDON 'EJECT' KNOB (W SILKSCREEN&PAINTED)	1.0
12	6083-510010-000-01	HARMAN/KARDON FUNCTION KNOB (W SILKSCREEN&PAINTED)	1.0
13	6083-510011-000	STAND, FRONT-5CD	2.0
14	6083-510012-000	STAND, REAR-5CD	1.0
15	6083-510013-000	*BRACKET, 5CD-SIDE 1	1.0
16	6083-510014-000	*BRACKET, 5CD-SIDE 2	1.0
17	6083-510016-000	BRACKET, WIRE	1.0
18	6505-050003-001	5CD CABINET HOLDER B	2.0
19	6583-510001-001	BOTTOM CABINET	1.0
20	6583-510002-000-01	TOP CABINET, PAINTED	1.0
21	6583-510003-001-03	HARMAN/KARDON FL8550 R/P (117V FCC&CSA VR)	1.0
22	6583-510004-001	BRACKET, FRONT PANEL	1.0
23	6583-510006-000	BRACKET, PHONES (MIC)	1.0
24	6600-010293-000	SPRING, POWER SWITCH	1.0
25	6600-020010-000	CD420L01 PCB MOUNT.	4.0
26	6600-070003-000	CD90R05 RUBBER PAD,LEG	4.0
27	6600-120030-001	NUT M3 HEX M3X5.5X2.4MM	1.0
28	6600-120040-000	SCREW NUT M4X7X3	2.0
29	6600-210035-000	PADCOCK 10X10X7MM	1.0
30	6600-210036-000	PADCOCK FL 70X12X2.5MM	1.0
31	6600-260001-000	LUG CS-1 BLK	2.0
32	7002-606010-062	SCREW M2.6X6 W/H	8.0
33	7003-006001-111	SCREW M3X6 S.T.P. B/H (BLACK)	31.0
34	7003-006002-112	SCREW M3X6 P.T.P. B/H	4.0
35	7003-008001-111	SCREW M3X8 S.T.P. B/H BLK	1.0
36	7003-008002-111	SCREW M3X8 P.T.P. B/H (BLACK)	7.0
37	7003-008002-112	SCREW M3X8 P.T.P. B/H	35.0
38	7003-008003-112	SCREW M3X8 B TYPE B/H ZN	2.0
39	7003-008010-111	SCREW M3X8 B/H BLACK	1.0
40	7003-016002-112	SCREW M3X16 PTP B/H ZN	2.0
41	7004-010010-112	SCREW M4X10 B/H	2.0
42	7103-012010-022	WASHER M3X12X1MM	1.0
43	7103-209008-022	WASHER M3.2X9X0.8	2.0
44	7104-010010-022	WASHER M4X10X1MM	3.0

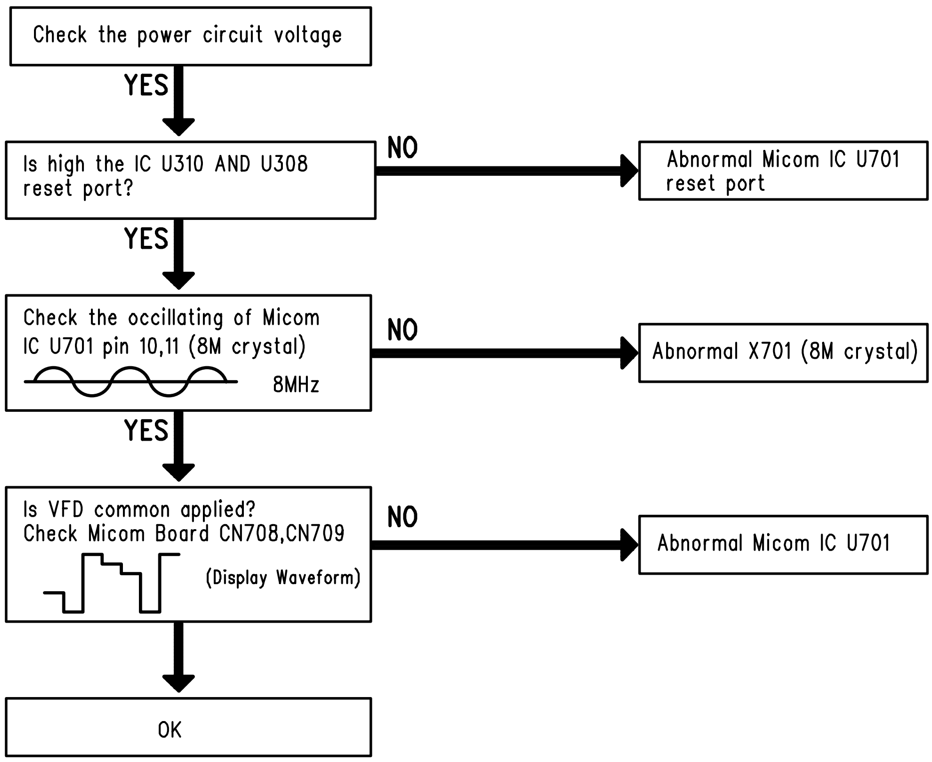
Item	Part Number	Description	Qty
	9485-501001-071	**FL8550 POWER UNIT 120V UL REV A**	
1	3200-480140-401	TRANSFORMER EI48 117V CUL #4801Y44T-1 (WINBOND)	1.0
2	4002-311975-000	TOROID COILS 'T31X19X7.5MM'	1.0
3	6600-180007-000	AC CORD BUSHING (PG5RF-5B)	1.0
4	6600-240003-001	CLOSE END CONNECTOR (CE-1)	2.0

Item	Part Number	Description	Qty
	9805-030001-051	**REMOTE UNIT (RT03-005) 31 KSYS (FL8550) REV A**	

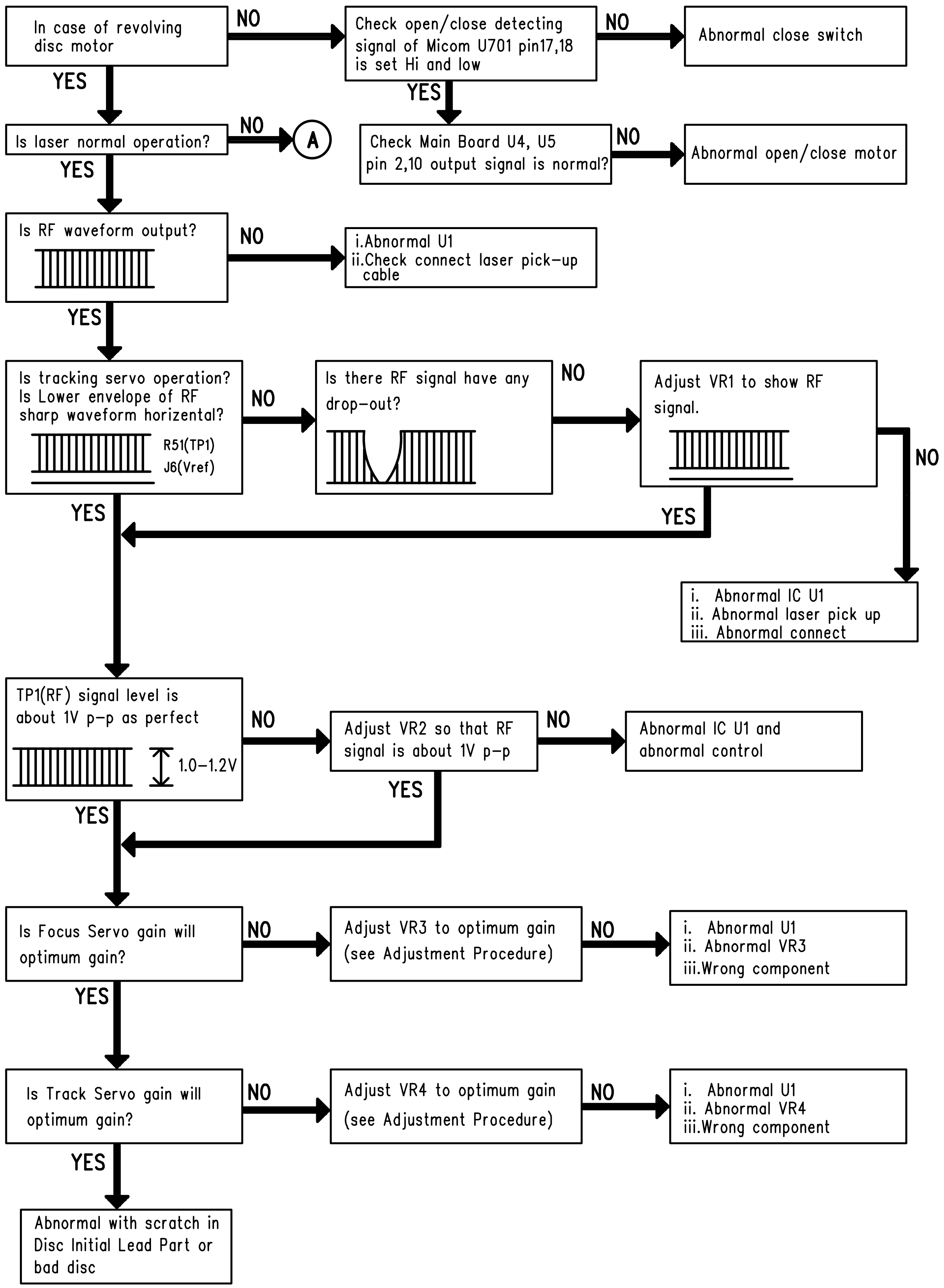
TROUBLESHOOTING (DETAILED)



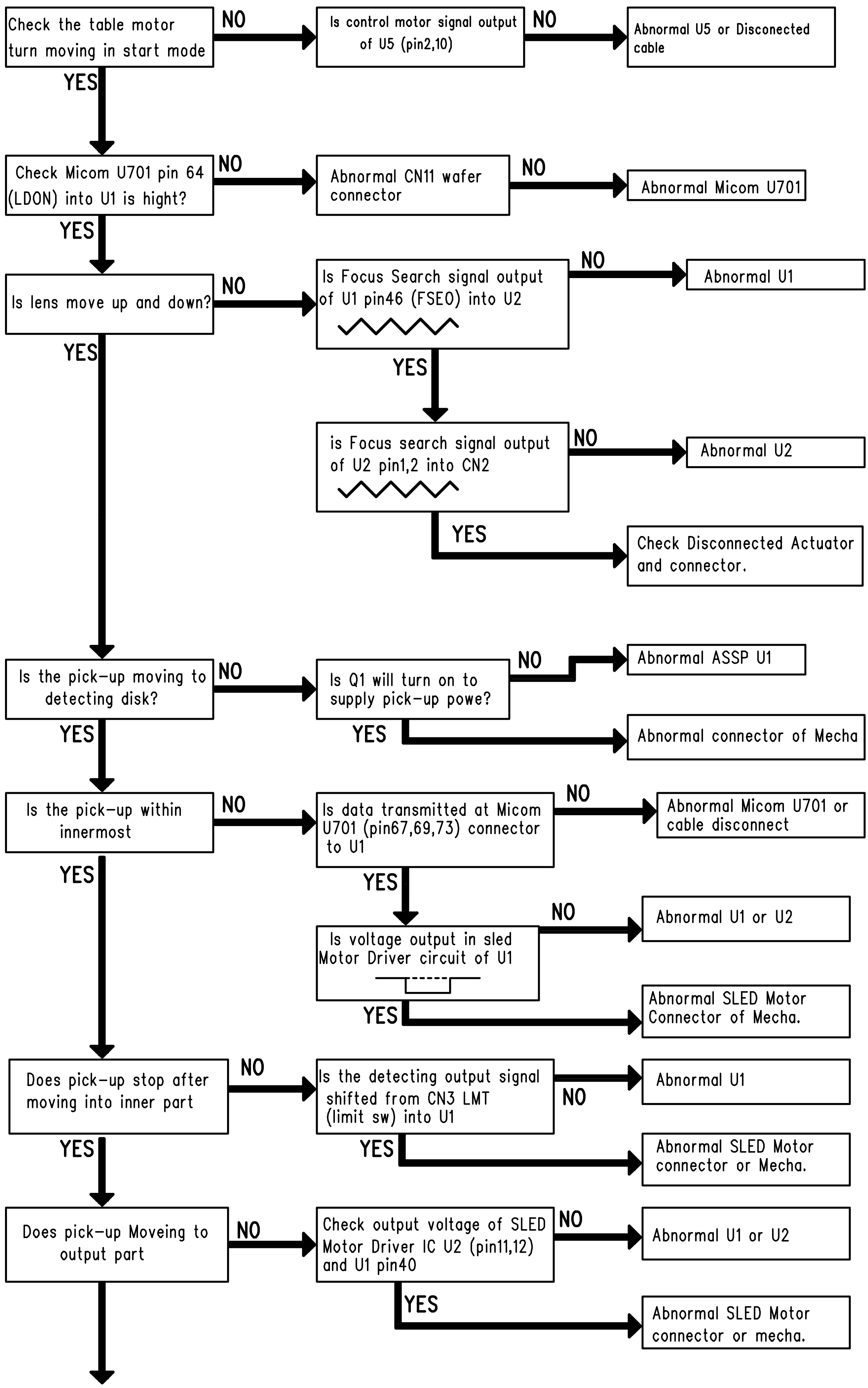
In Case of Abnormal Indication



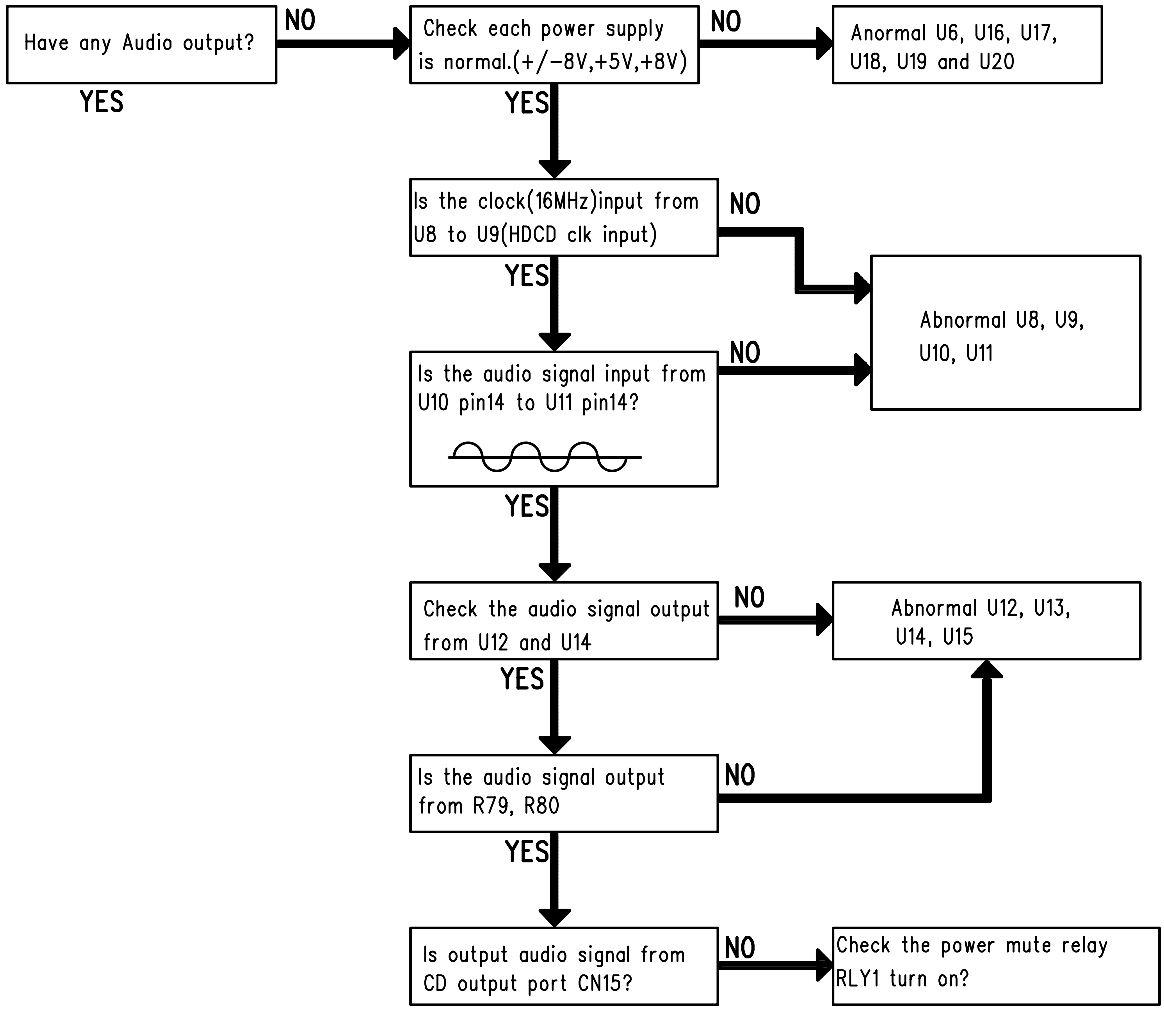
When Initial Lead-In Is Not Operational



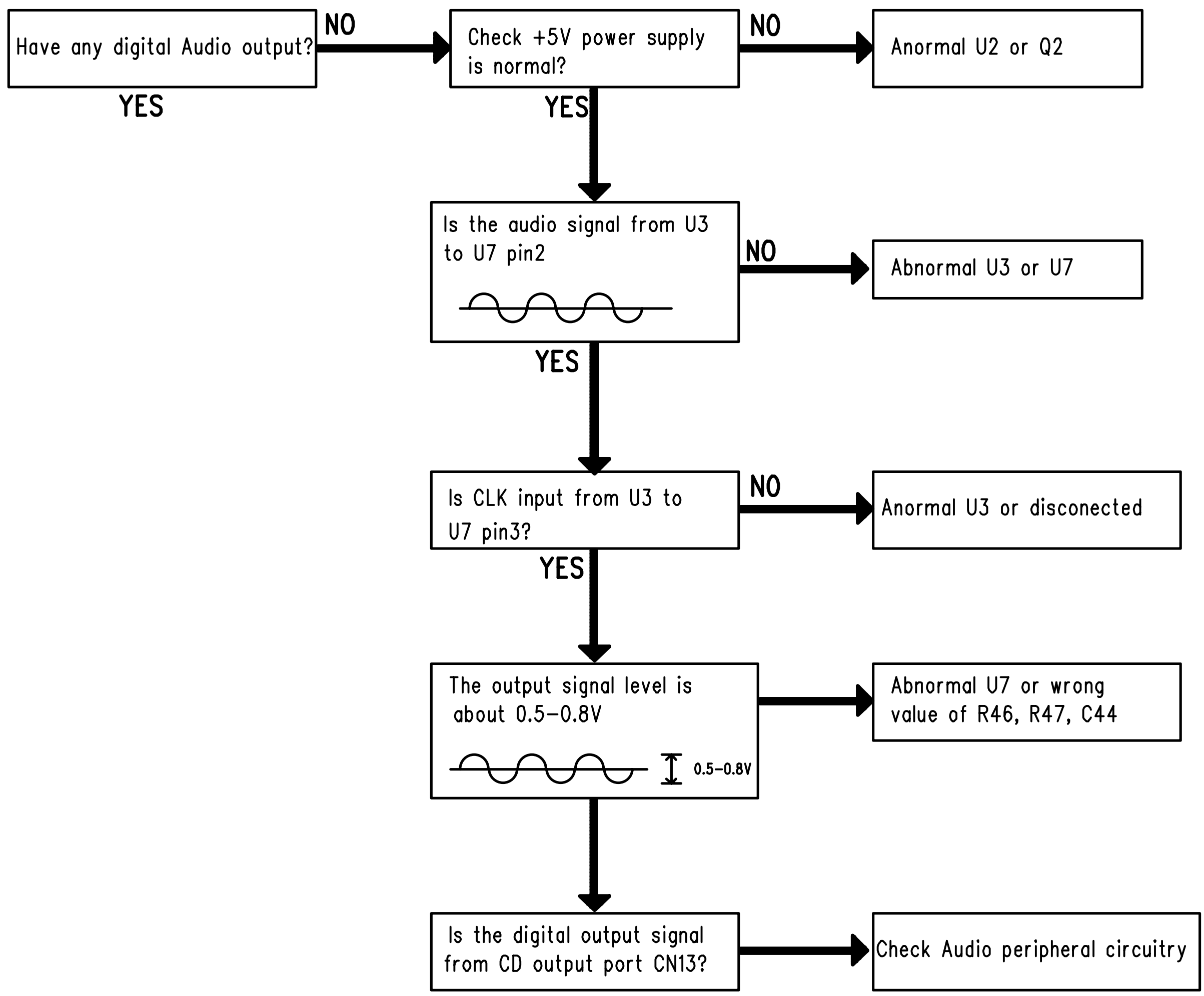
A: When Laser is NOT Operation



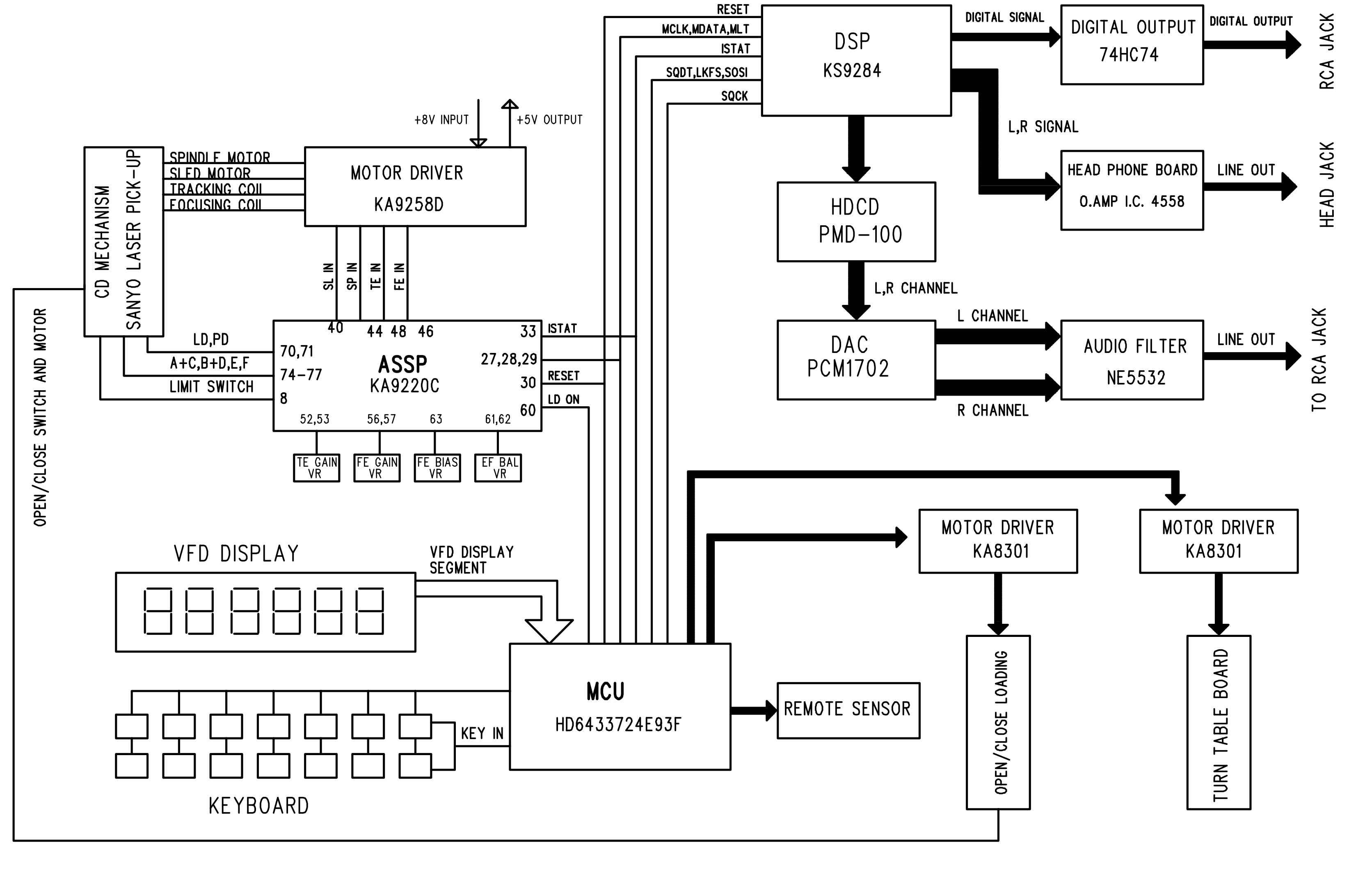
2) Audio Circuit Checking

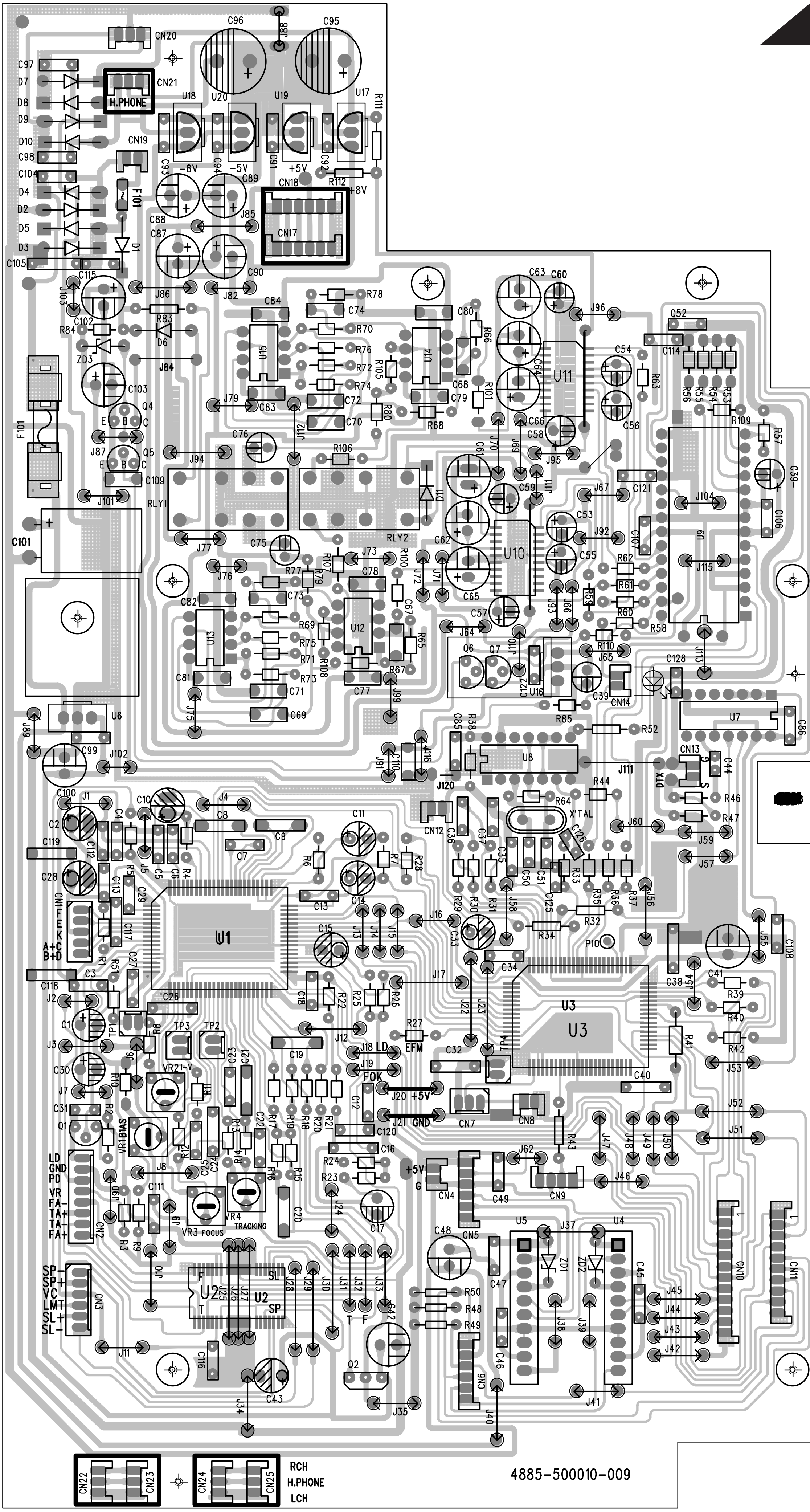


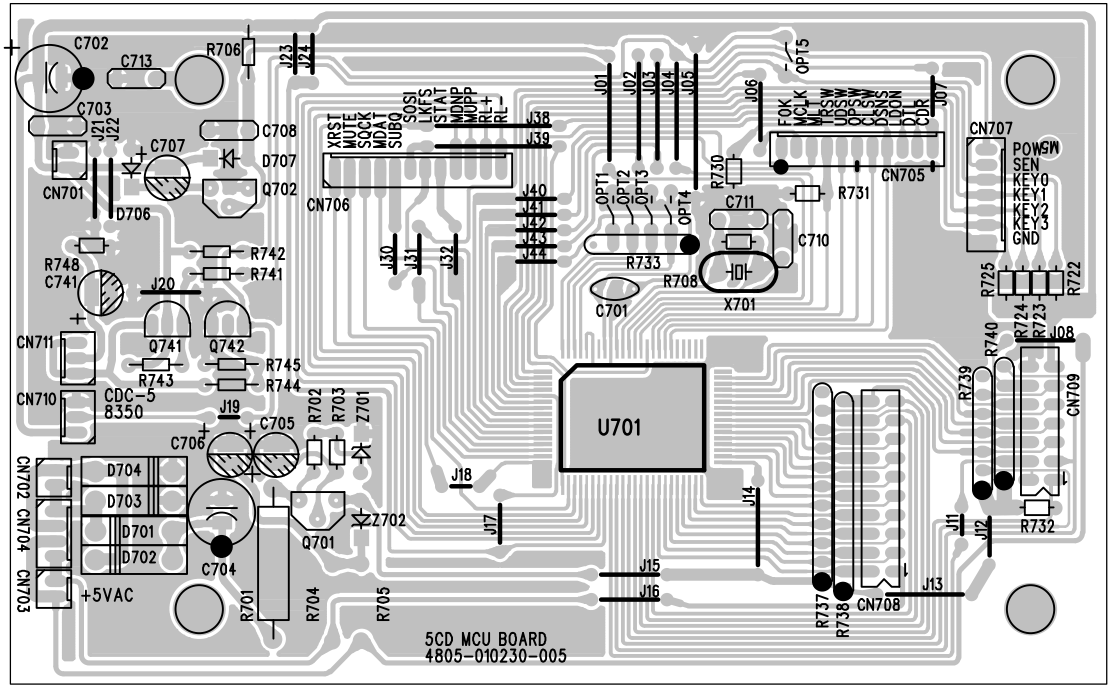
3) Digital Audio Circuit Checking



FL8550 BLOCK DIAGRAM OF SAMSUNG CHIPSET I




H.PHONE
-8V
-5V
+5V
+8V
RLY1
RLY2
X'TAL
DTX
TRACKING
VR3 FOCUS
VR4
VR2
VR1
EFM
FOK
LD
J20 +5V
J21 GND
LD
GND
PD
VR
FA-
TA+
TA-
FA+
SP-
SP+
VC
LMT
SL+
SL-
RCH
H.PHONE
LCH
4885-500010-009

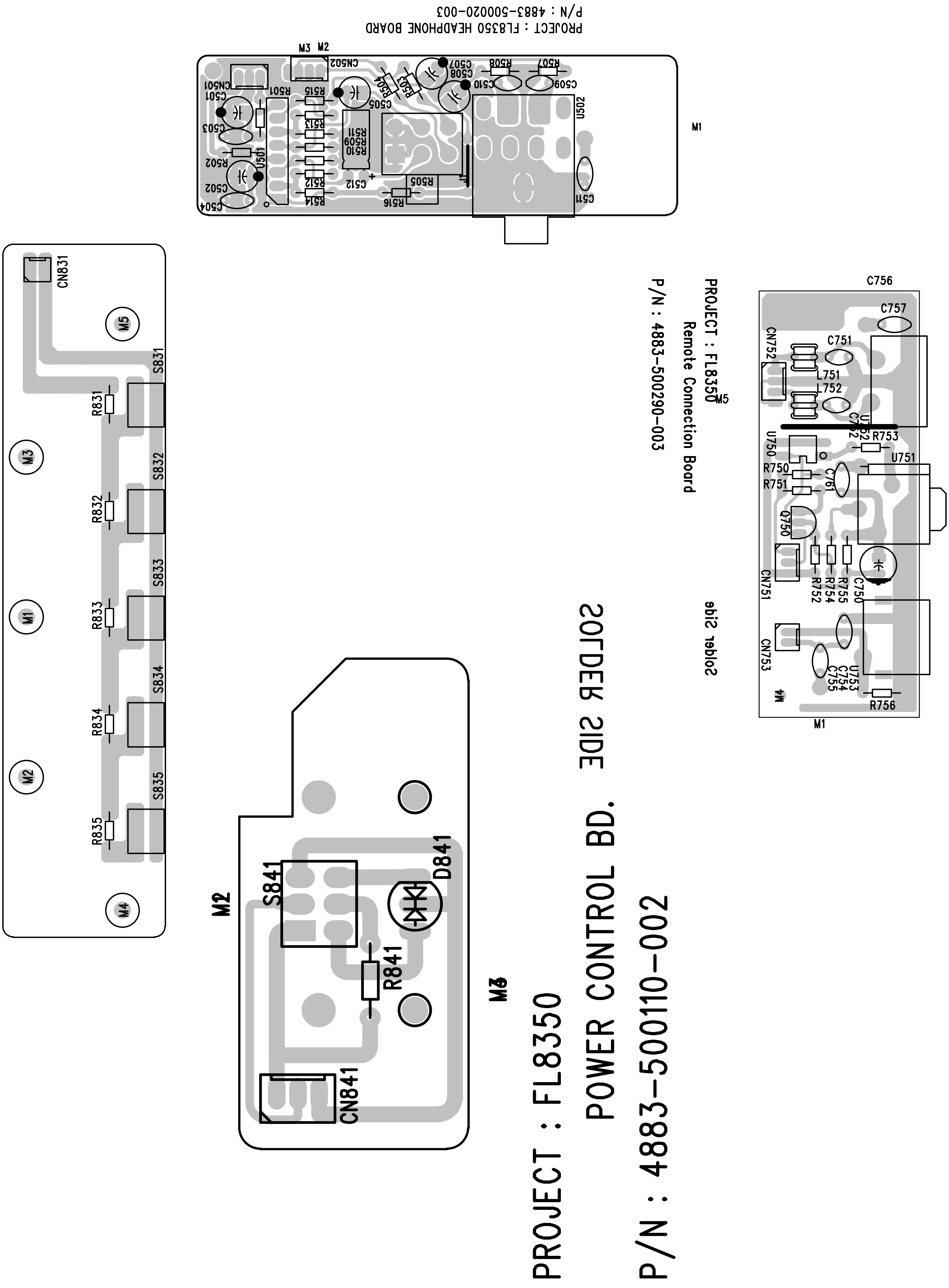


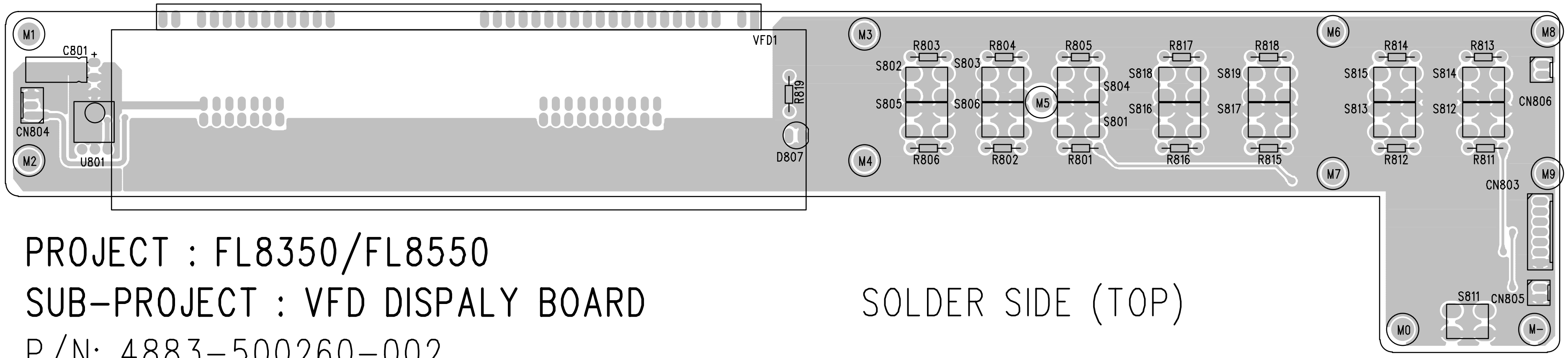
PROJECT : FL8350

SILK SCREEN

SUB-PROJECT : MCU BOARD (VFD)

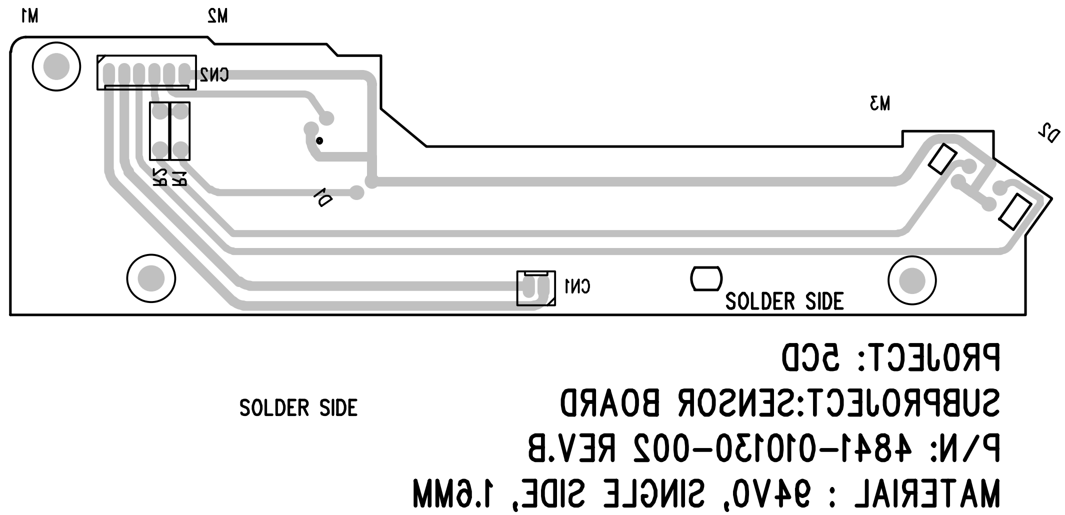
P/N:4805-010230-005


PROJECT : FL8350 HEADPHONE BOARD
P/N : 4883-500020-003
PROJECT : FL8350
Remote Connection Board
P/N : 4883-500290-003
Solder Side
SOLDER SIDE
PROJECT : FL8350
POWER CONTROL BD.
P/N : 4883-500110-002



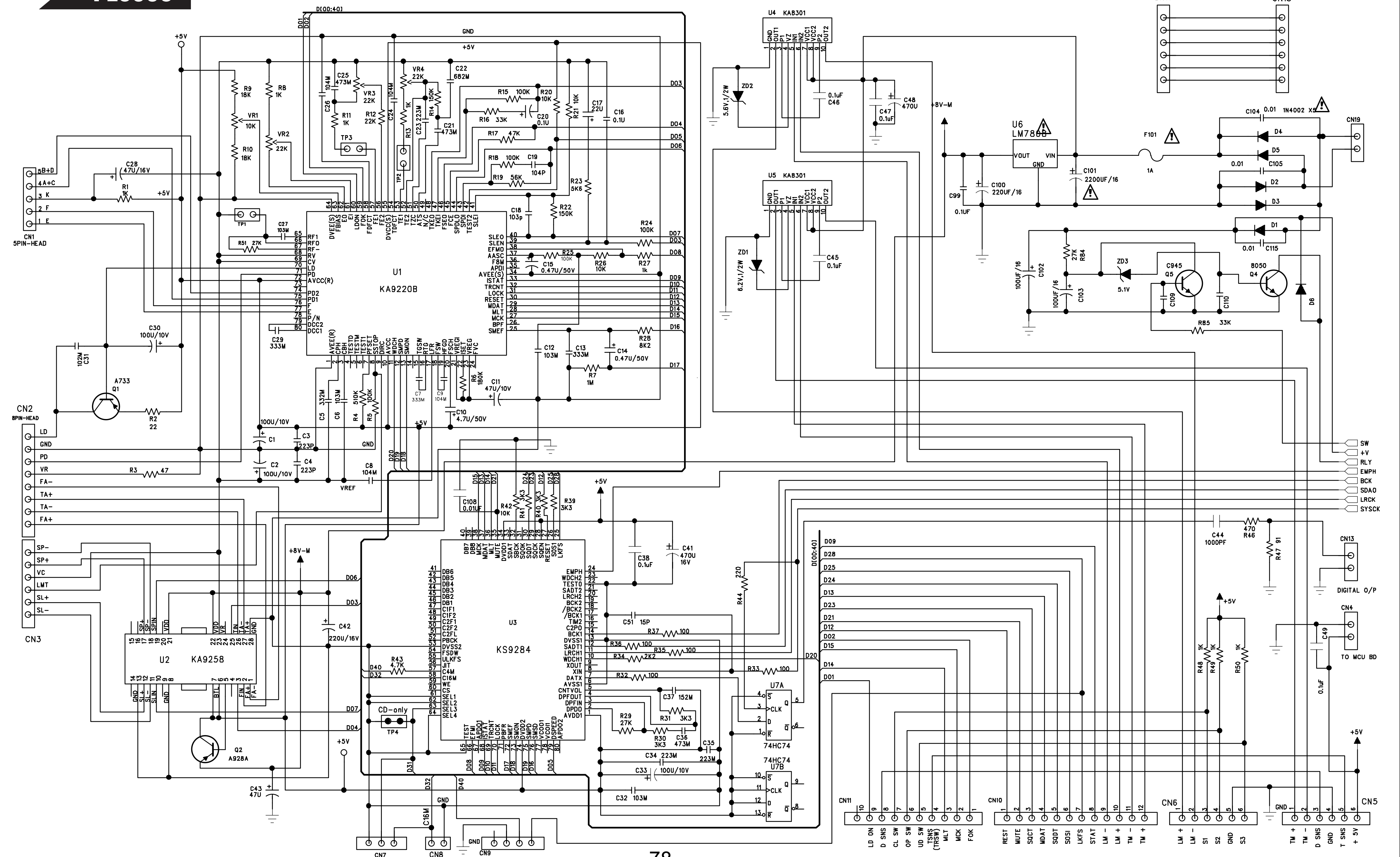
PROJECT : FL8350/FL8550
SUB-PROJECT : VFD DISPALY BOARD
P/N: 4883-500260-002

SOLDER SIDE (TOP)

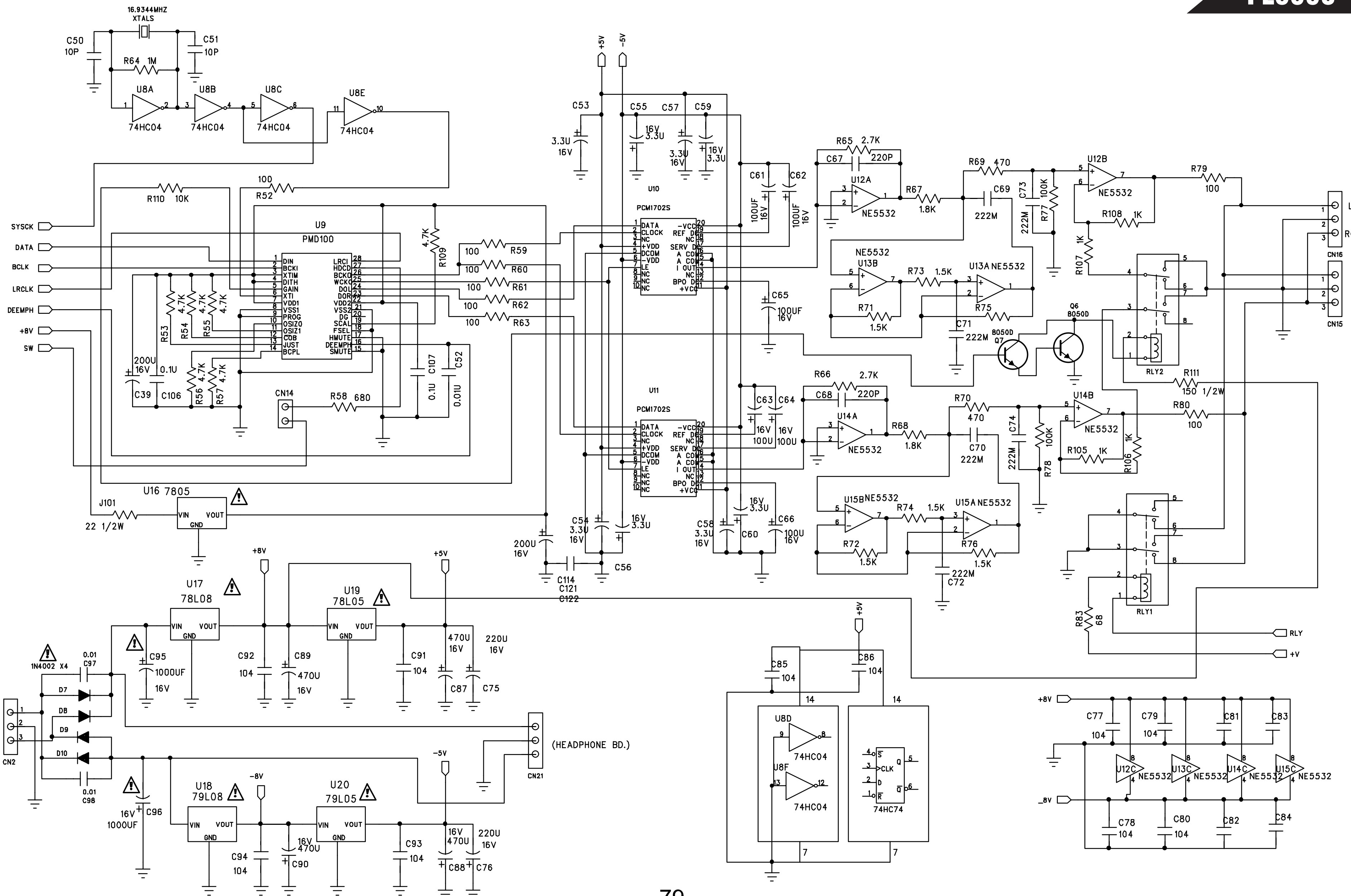


FL8550

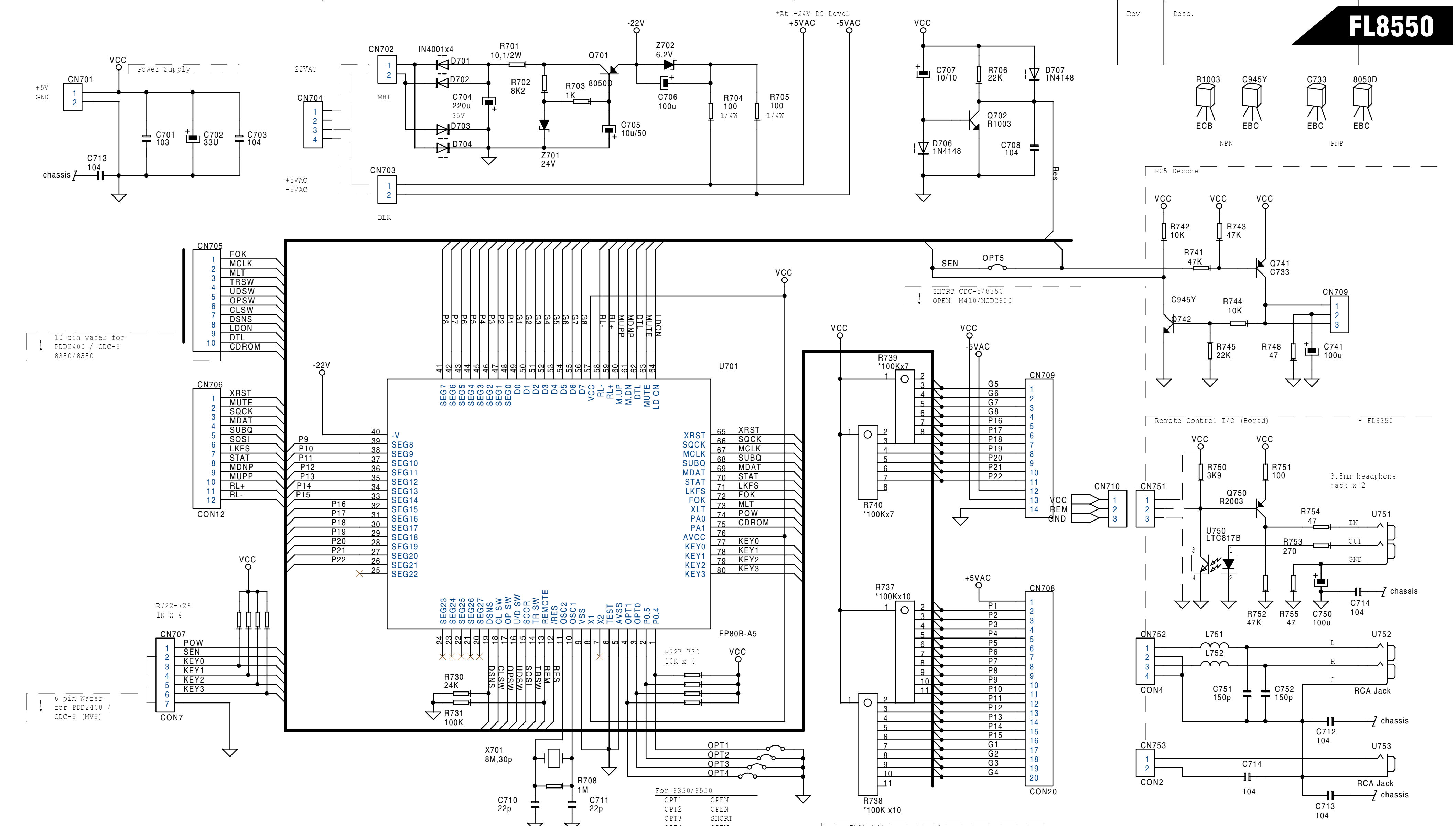
MODEL NO :	PART NO :	PART NAME :



PURPOSE : SAMPLE MAKING	PRODUCTION	SHEET OF	REV
PREPARED BY :	CHECKED BY :	APPROVED BY :	



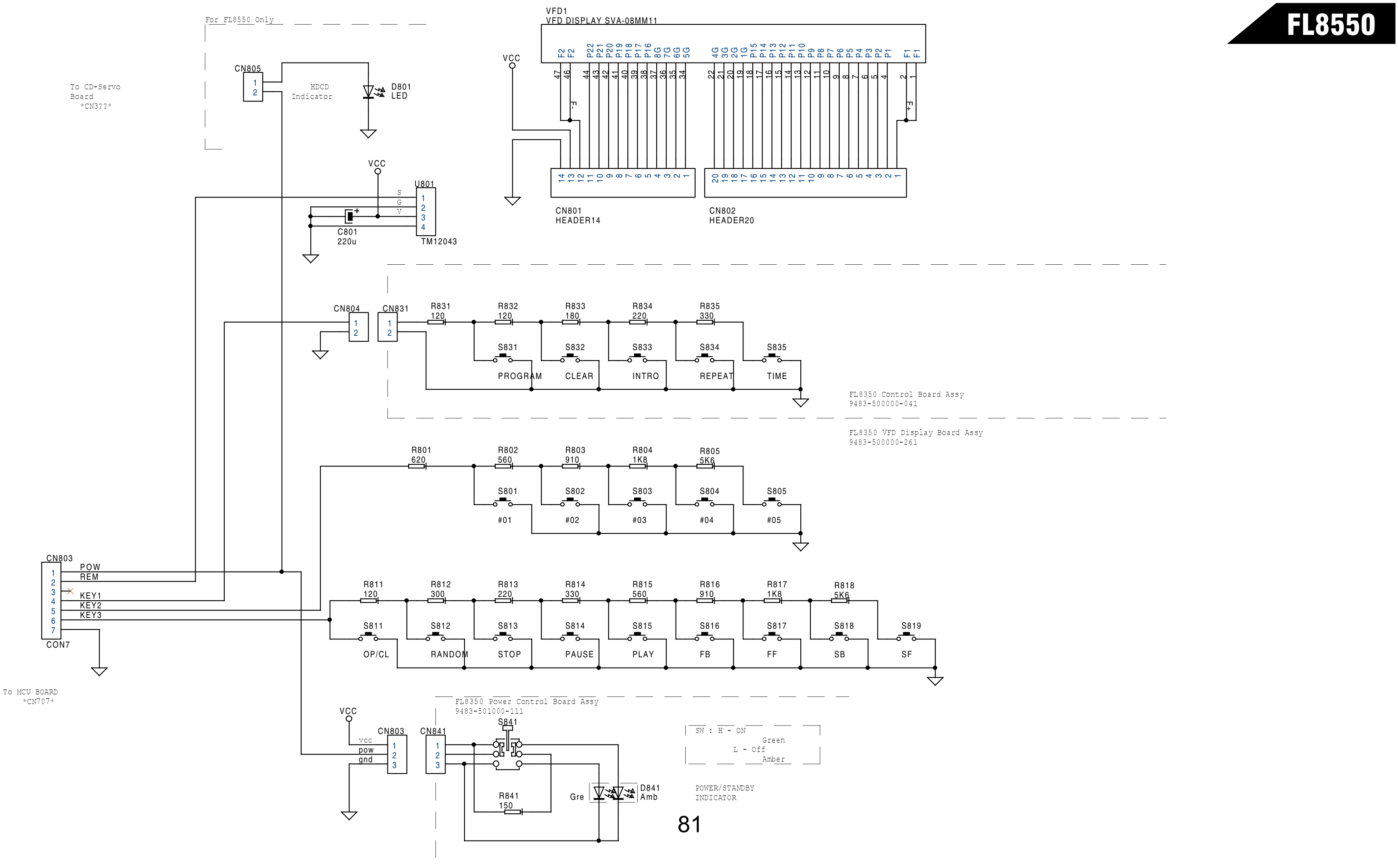
PURPOSE : SAMPLE MAKING	PRODUCTION	SHEET OF	REV
PREPARED BY :	CHECKED BY :	APPROVED BY :	



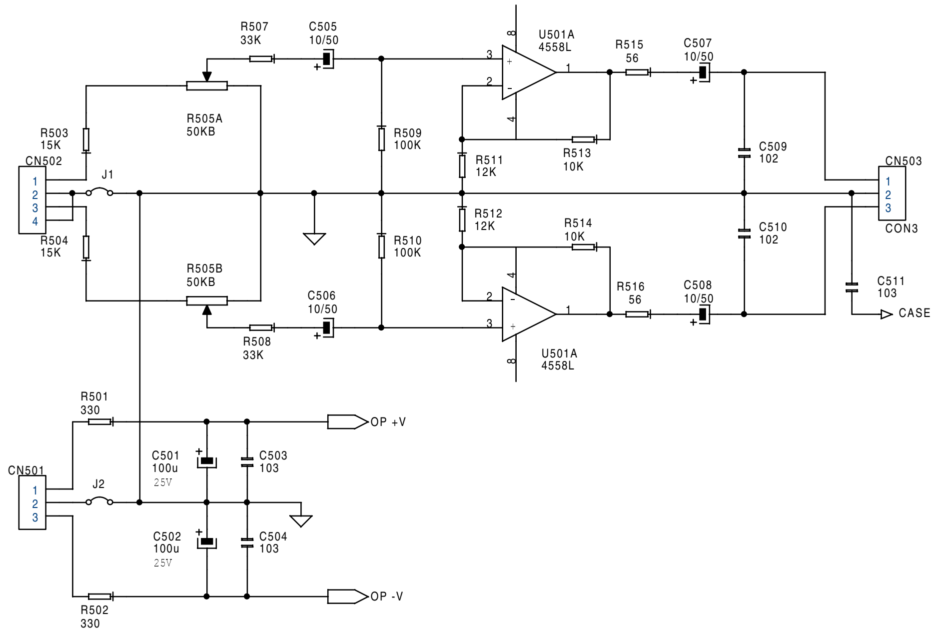
REMARK: 1) ALL RESISTORS ARE CARBON FILM +-5% 1/6W UNLESS SPECIFIED.
2) ALL CAPACITORS WITH VALUE <1UF ARE CERAMIC +80% -20% UNLESS SPECIFIED.
3) ALL CAPACITORS WITH VALUE >=1UF ARE ELEC-CAP +-20% 16V UNLESS SPECIFIED.
4) ALL DCAP ARE 0.1UF CERAMIC CAP +80% -20%
* SUBJECT CHANGE WITHOUT NOTICE *

Ref: 8350\835MCU0

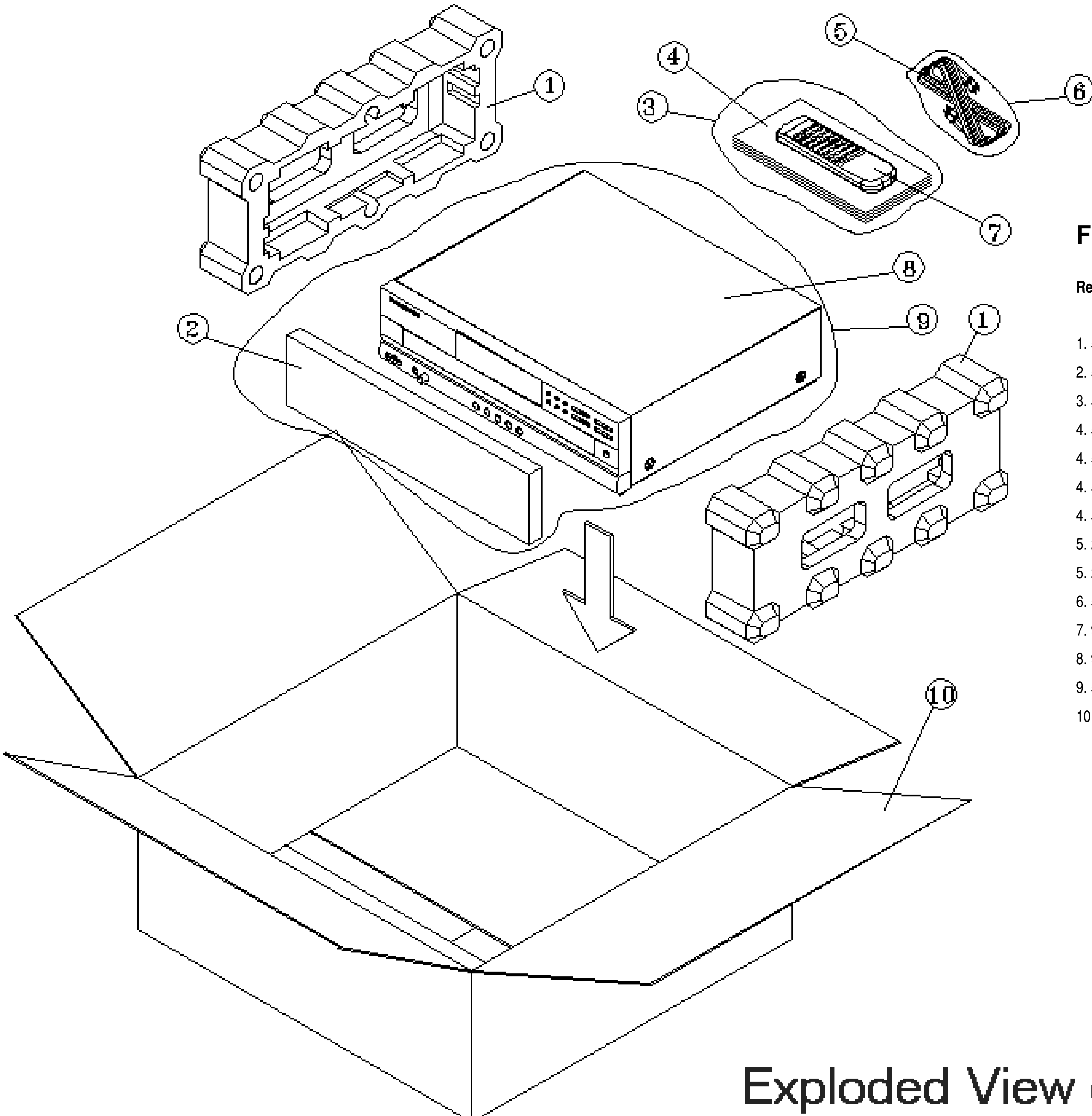
FL8550


For FL8550 Only
To CD-Servo Board *CN3??*
CN805
HDCD Indicator
D801 LED
VCC
U801
S
G
V
C801 220u
TM12043
VFD1
VFD DISPLAY SVA-08MM11
F2 F2 P22 P21 P20 P19 P18 P17 P16 8G 7G 6G 5G 4G 3G 2G 1G P15 P14 P13 P12 P11 P10 P9 P8 P7 P6 P5 P4 P3 P2 P1 F1 F1
F-
F+
CN801 HEADER14
CN802 HEADER20
CN804
CN831
R831 120
R832 120
R833 180
R834 220
R835 330
S831 PROGRAM
S832 CLEAR
S833 INTRO
S834 REPEAT
S835 TIME
FL8350 Control Board Assy 9483-500000-041
FL8350 VFD Display Board Assy 9483-500000-261
R801 620
R802 560
R803 910
R804 1K8
R805 5K6
S801 #01
S802 #02
S803 #03
S804 #04
S805 #05
CN803
POW
REM
KEY1
KEY2
KEY3
CON7
To MCU BOARD *CN707*
R811 120
R812 300
R813 220
R814 330
R815 560
R816 910
R817 1K8
R818 5K6
S811 OP/CL
S812 RANDOM
S813 STOP
S814 PAUSE
S815 PLAY
S816 FB
S817 FF
S818 SB
S819 SF
FL8350 Power Control Board Assy 9483-501000-111
S841
CN803
vcc
pow
gnd
CN841
R841 150
Gre
D841 Amb
SW : H - ON Green
L - Off Amber
POWER/STANDBY INDICATOR

FL8550



* J1 and J2 are used to select to GND path



FL8550 PACKING PART LIST

Ref.	Part No.	Description
1.	5000-835001-001	POLYFOAM, FL8550
2.	5206-500160-050	E.P.E. SHEET P-EP500160-05
3.	5200-230321-030-01	POLYBAG FOR ACCESSORIES
4.	5100-855000-100	OWNER'S MANAUL FL8550 120V
4.	5103-835000-100	LIMITED WARRANTY SHEET
4.	5103-835000-200	WRRANTY SERVICE SHEET
4.	5199-835000-100	SAFETY PRECAUTIONS SHEET
5.	2611-310009-000	1M AUDIO CABLE
5.	2617-210004-001	3.5MM MIC CABLE
6.	5200-100180-030	POLYBAG FOR AUDIO CORD
7.	9805-030001-051	REMOTE CONTROL (FL8550)
8.	9801-855000-003	FL8550 MAIN UNIT
9.	5200-600600-040-03	POLYBAG FOR UNIT
10.	5013-835001-001-04	FL8550 OUTER CARTON 120V)

Exploded View of Unit packaged